THE AMERICAN GAS LIGHT JOURNAL

PUBLISHING OFFICE No. 42 PINE STREET

DEVOTED TO THE INTERESTS OF ILLUMINATION, HEATING, MECHANICAL, CHEMICAL AND GENERAL SCIENCE.

VOLUME XCII., No. 24. Whole No. 1,827. | NEW YORK, MONDAY, JUNE 13, 1910. | $3 PER ANNUM, IN ADVANCE.

A. M. CALLENDER & CO., Proprietors. C. H. WADELTON, Manager. THOMAS J. CUNNINGHAM and ELBERT P. CALLENDER, Editors.

ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS SECOND-CLASS MATTER.

Published on each Monday of the year, at No. 42 Pine Street, New York City.

Telephone.—2996 John.

Terms of Subscription, Including Postage.—For the United States, $3; Canada, $4 per annum. European countries, $5 (£1—25 francs).

Remittances should be made either by post office order, express money order, registered letter, or bank draft on New York, payable to the order of A. M. Callender & Co.

Correspondence.—Wishing to make this JOURNAL a gazette of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, correspondence is solicited for publication from all who make the study of those subjects a pleasure or a profession.

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The American News Company, Nos. 39 and 41 Chambers street, New York, are agents for this JOURNAL. Newsdealers will send orders to them. All payments to be made in advance. Single copies, 10 cents.

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[OFFICIAL NOTICE.]

Sixth Annual Meeting, Iowa District Gas Association.

IOWA DISTRICT GAS ASSOCIATION,
OFFICE OF THE SECRETARY,
DES MOINES, IA., May 28th, 1910.

To the Members, Iowa District Gas Association: The Sixth Annual Meeting of the Iowa District Gas Association will be held in Sioux City, Ia., June 15th, 16th and 17th, 1910. The meeting will be called to order at 10 A.M., June 15th, by the President, Mr. Geo. H. Waring, of Omaha. The following papers will be read:

"The Gas Company's Policy Toward the Public," by Mr. Campbell Fair, Oskaloosa, Ia.

"Depreciation," by Mr. R. Shacklette, Detroit, Mich.

"How We Increased Gas Sales in Lincoln," by Mr. J. E. Shuff, Lincoln, Neb.

"Boiler Fuel Leaks," by Mr. J. B. Myers, Omaha, Neb.

"Advantages of High Pressure in a Low Pressure System," by Mr. B. C. Adams, Lincoln, Neb.

"Distribution in a Small Gas Plant" (Special references to general operation, street leakage, station meter, etc.), by Mr. A. W. Borden, Hasting, Neb.

The following standing committees will report: New Business; Gas Works' Construction; Gas Manufacture; Distribution; Uniform System of Accounts.

In addition the following special features will form part of the programme:

1. A lecture by Mr. Rufus C. Dawes.
2. A lecture by Mr. Norman Macbeth, illustrated with lantern slides, on "Illuminating Engineering Factors in Gas Illumination."
3. A lecture by Mr. J. B. Klump, on the "A B C of Calorimetry."

The headquarters will be at Hotel West. Best accommodations are always obtained by reservation secured in advance. For further information address, G. I. VINCENT, Sec'y and Treas.

BRIEFLY TOLD.

IN MEMORIAM—MR. EDMUND H. MCCULLOUGH.—At a special meeting of the Board of Directors of the Westmoreland Coal Company, held June 1st, 1910, the following resolutions were unanimously adopted:

Resolved, That the Board of Directors of the Westmoreland Coal Company has learned, with deep sorrow and regret, of the death of the President of this Company, the late Edmund H. McCullough, which occurred Tuesday, May 31st, 1910.

Mr. McCullough entered the service of the Westmoreland Coal Company in the year 1869 and, on February 15th, 1871, was appointed Assistant Secretary of the Company. He was successively advanced to higher official positions and, on December 19th, 1889, he became President of the Company. On the same date he was elected a Director of the Company. During his connection with this Company he served it with untiring zeal, great ability and admirable judgment.

His intimate knowledge of the affairs of the Company and his experience and capacity in the business conducted by it, made him a most valuable officer and director. During his administration the Company's business has greatly increased and the highest commercial success has been attained.

The personal loss sustained by the remaining members of this Board and by the officers of this Company is irreparable. Mr. McCullough's high personal character, his kindly consideration, his genuine and other admirable qualities, endeared him to all who were associated with him, and render his loss to them a grievous blow.

Resolved, That a copy of the above resolution be spread at length upon the minutes of this meeting, and an engrossed copy be sent to the family. HENRY WHARTON, Secretary.

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[Special Editorial Correspondence.]

THIRD ANNUAL MEETING, CANADIAN GAS ASSOCIATION.

Dear JOURNAL: I write this, the night of the 8th, on the eve of the proroguing of the third annual meeting of the Canadian Gas Association, and right after a pretty close inspection of the exhibition of appliances gaseous, that has been on since Monday. Gas men are arriving from all points in the Dominion, and in the listings are quite a number from the States. The exhibition is certainly a most creditable one, and Alexandra Rink or Hall, albeit on the small side for such an affair, afforded very good housing for the exhibits and fairly good lanes for the travel of the visitors. And particularly is it creditable when one remembers that it was the first thing of the sort ever attempted in the Dominion. Hamilton never looked better, which is saying much, for those who have ever visited it know that it is really a bright jewel in the Dominion crown, and to the gas men of the State it is especially well in mind, for out of its former residents came the late Mr. T. G. Littlehales, whom the gas men of your side the border also honored and loved. But as he was, so Mr. John Keiller is, and, as Chairman of the Executive Committee, and our host as well, we salute him as a worthy successor of the elder Littlehales. The prepations for the meeting are all effective, and before I close this preamble let me add that notable in the exhibition booths are well prepared displays of the wares of the Humphrey arc and other types of its famous lamps, by the General Gas Light Company, and a full line of the lamps and lighting specialties by the Welsbach Light Company. As usual, the H. Mueller Mfg. Company shows in artistic array samples of its world-famous specialties, and as is always usual with it, its stand seems headquarters for the gas men generally. Another attractive show is that put forth by the Drakes, Limited, of Halifax, England, and still another is the meter array by the Pittsburgh Meter Company and the Metric Metal Works, and a representative showing of the sterling goods from the shops of the George M. Clark Company. The weather conditions are good, although, strange to say, I did hear some complaint about a rather high temperature.—C. H.

ALEXANDRA RINK, HAMILTON, CAN., June 9, 1910.

Dear JOURNAL: The morning session of the first day of the third meeting has just adjourned. The day was ushered in by bright sunshine, although it was reserved for some to remark that "'Tis cool this morning." The call to order was sounded at 10 A.M. by the President, J. S. Norris, of Montreal; and, truth to tell, that urbane gentleman, if increasing weight be taken as a believable indication, seems to find the climate of America agrees with him very well. And that, too, despite the fact that the work which he was called on to initiate at and in the Montreal Company's business management, was awesome for its "mixity." A like remark applies to our own Howard E. Mann, who, if outward appearances count for aught, finds balm in Montreal's atmosphere and "restfulness in his labors" there—how's that for a contrariety? He sends his greetings to his *fraters* in the States, and in forwarding these I would intimate that if the "city fathers" of Cleveland would really know the value of the artificial gas plants there (and they seem to be having much trouble over such determining), Mr. Mann is truly the man for their needs. Perhaps 100 delegates responded to the call for order, and a goodly cheer went up when President Norris introduced his Honor, Mayor McClaren, who gave the Association a royal welcome to Hamilton. The response by Mr. E. J. Phillips, of Berlin, was quite a neat bit of speech-making, and if the Mayor was expecting a Roland for his Oliver he was not in any sense disappointed. The routine which followed included the appointment of a Nominating Committee, and the report from the Executive Committee. The burden of this had to do with the work so well carried out last year by ex-President J. C. Hay and his associates, respecting the methods and means of collecting duties on gas coal and other coals imported into the Dominion. While nothing of definite results could be stated, it was nevertheless shown that a decided effect on the governmental ear had been sounded; and it was the belief that the good results accomplished by persistence in this respect would speedily be apparent. Another report also showed that fair progress had been made in respect of the effort to have the value of gas expressed in calories rather than in candle power units. The reports of the Secretary and Treasurer showed that Mr. Moore's attention to his duties were bringing forth good fruit in that there was a good balance in the treasury, and that the membership list was increasing in a satisfactory way. At this point a pleasing interlude was afforded in the call that was made for some remarks from Mr. John Coates, whose appearance on the Canadian gas field was made some years ago by way of Ottawa, *en route* from Australia. His recountings (and well worth listening to they were) were followed by the paper on "Some Methods of Measuring Light," prepared by Mr. W. C. Philpot, of Toronto. It was unfortunate that the paper had not been printed in time, which omission virtually cut off any debate, since the mass of figures in it could not be readily referred to on memory account. Next came a demonstration on "New Business Methods," by Mr. B. G. McNabb, of Montreal, which led to some discussion, which was ably contributed to by Mr. Arthur Hewitt, of Toronto. This brought the election of officers, the result of the balloting being as follows:

President.—Mr. Arthur Hewitt, Toronto.
First Vice-President.—Mr. E. J. Philip, Berlin.
Second Vice-President.—Mr. A. W. Moore, Branford.
Secretary and Treasurer.—Mr. John Keillor, Hamilton.
Executive Committee.—Messrs. J. F. Leishman, J. M. H. Young, R. A. Wallace, Chas. Forbes and P. S. Coate.

This list was not exactly in accordance with custom; but the First Vice-President (Mr. W. H. Pearson, Jr.) declined to go on to the Presidency, giving as his reason therefor that hereafter his business interests would not be in line with the manufacturing end of the industry. His determination was the cause of the expression of many regrets, coupled with the hope that whatever he undertook to do would be done to his advancement from every point of view. An adjournment was ordered, to terminate at 2:30. We will be photographed this afternoon, and the entertainment for the evening is a dinner first and amusements afterwards at Hamilton's famous outing place, beautiful Burlington Beach. The ladies, of whom many are in evidence, are being entertained in a way that moves them to say our hosts are royal entertainers.—C. H.

HAMILTON, ONT., June 9th, 1910.

Dear JOURNAL: The balance of to-day was entirely given to the social side, and a most enjoyable afternoon and evening were thus spent. Luncheon having been satisfactorily disposed of, and in bodily fullness, the party was arranged by the photographer around the approach to the Rink, where we were duly pictured. The intervening hour or so was appropriately spent in social intercourse, it having been tacitly agreed upon that no technical business would be taken up through the afternoon. This gave ample opportunity to reinspect the exhibition, which chance was very generally availed of. In connection with this I might add that the Hamilton Gas Light Company has an excellent display of roofing felt, tarred paper, etc. and that another attractive display shows up in good style the apparatus and wares of the Safety Gas Main Stopper Company. At 5:30 two specially chartered trolley cars conveyed us to Burlington Beach, about 12 miles from the city, and right across the bay, where we enjoyed an excellent dinner, which was well served in the beautiful quarters of the Royal Hamilton Yacht Club. The speeches that followed, though few, were in perfect tune with the mood of the diners, and a completely jolly time was ended when the return to Hamilton was ordered. A moonlight excursion is planned for to-morrow (Friday) night, when all hands will entrust themselves to the shelter of the good steamer "Turbinia." Of course, we do not expect the moon to be "at the full," for 'tis early in the month. However, it is certain that there will be light enough. If possible to get you by wire in time to-morrow, I'll send on some account of the finish of the business sessions, which should be concluded by noon.—C. H.

CURRENT MENTION—

"WELL, that grand old veteran Herr Steinwedell has another daughter, which certainly counts for much, when we recall that he has some bouncing, healthy, lusty grandchildren. However, the way it was is this: On the evening of the 8th inst. his son George, and a smart, good-looking youngster he is, took unto himself a bride in the lovely person of Miss Ruth S. Bjornstad. The ceremonies were brought off in the home of the bride, 766 Goodrich avenue, St. Paul, Minn., the Rev. Mr. Kreinhuder officiating. The bride was attended by her sister, and brother William ministered to the needs of the groom. It was a very pretty ceremony, as those who witnessed it will attest. Glück Auf.—C."

MR. WILLIAM MILLER, writing from Cumberland, Md., under date of the 8th inst., says: "Henry Hall died Thursday, June 2d, 1910, at the age of 77 years. He was born in slavery and had been sold several times, prior to the Civil War. For the last 44 years he has worked continuously for the Cumberland Gas Light Company and proved a most faithful employee."

WE regret to report the sudden death of Mr. O. F. Greim, General Manager of the Milwaukee Coke and Gas Company, who passed away, from his home in that city, Monday, the 6th inst.

Steeple Jacks and Modern Structures.

[Prepared for the JOURNAL, by "R."]

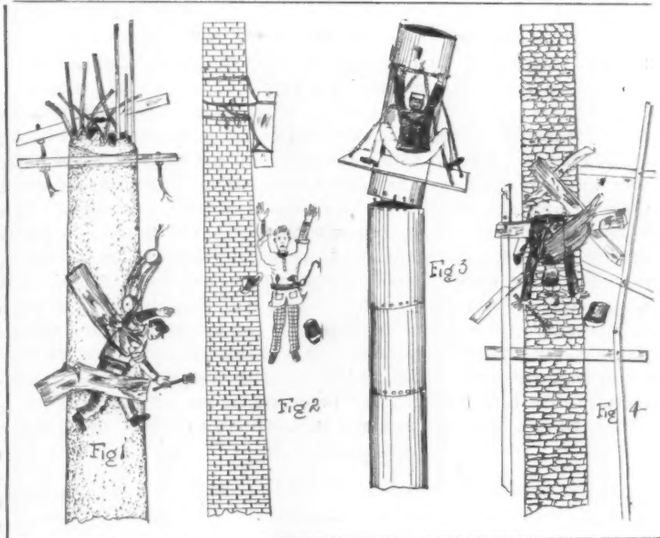
Recently unusual numbers of fatalities among the men who work high up on chimneys, tall spires and the like, have been reported. One reason for the increase in accidents to painters, repairers and constructors of tall structures can be attributed to the employment of modern apparatus and materials; for example, not long since a workman lost his life because of the crumbling away of a concrete tower on which he was working. The modern concrete smokestack, monument, spire or whatever it may be, can be quite firmly designed and erected, and when once in order will last indefinitely, and the various merits of cement structures along these lines are well known to builders and contractors; but oftentimes poor judgment is used, men get careless and accidents result. One of the most recent accidents, from the toppling of part of a concrete spire, was due entirely to the fact that the cement had not had time to properly set. Although the cement was still fresh, the workmen constructing the stack did so piece by piece or in sections, and worked gradually upward. As the progress towards the sky was faster than the cement could dry out and become fixed, in time, when at one of the upper laps, the supporting devices of the scaffolding broke away, due to the sinking and crumbling of the soft concrete, with the result that the workman who happened at that time to be on the staging dropped to his death, to the level of the ground, as shown in Fig. 1. Still, this accident does not prevent the forward progress of the use of concrete for stacks.

The concrete structure is slowly constructed with the rods of ribs forming the circle. The cylindrical effect, which gradually decreases towards the top, is supported by means of cross wires, steel netting and various other alignments of wires, all of which are placed and adjusted as the work proceeds upwards. If ample time is given the concrete to set, the danger of an accident due to the falling away of a section is very small.

The men who work on brick chimneys are also liable to take a drop at anytime, and the reports from various sections of the country indicate that such accidents have been on the increase in past years. This increase, of course, is partly due to the greater number of tall stacks. Much more building has been going on in the vicinity of industrial plants in the past few years, with the result that the owners of the power plants have been obliged to install an unusually large number of tall smokestacks to over-reach the surrounding structures in the obtaining of proper draft. The tendency has been to build higher and larger stacks of brick, cement, steel and other materials. The increased boiler pressure, larger engines and faster speed required of machinery, all demand that the draft for the furnaces be strong. In order to attain this end, the builders of stacks have been obliged to go higher and higher into space. Consequently the men who formerly had moderate sized stacks to climb and paint, repair, or fix in some way, find they have to do considerable climbing towards the clouds in order to get at the defective parts of some of the ponderous stacks of the present day. We are told of one party dropping 15 feet to his death from a staging which broke while he was working his way upward to get to the top of a brick structure, as in Fig 2.

The average Steeple Jack adheres to the old methods of ropes and single-board seat, the ropes being formed in loops, which loops he works upward, foot-by-foot, on the chimneys, while the man is seated on the board. In olden times, when the stacks were not high or large, this used to be comparatively easy, but the smokestack climbing fraternity report larger and higher stacks presented to them for climbing each season. And though it would seem that the limit had about been reached, still no man can tell. Of course, men who drop from the defective staging or toppling stack are not always killed. Here is a case: A party was fixing a column, when the rivets of the joint just below him separated, due to the increased weight on the upper section, the section looping over as illustrated in Fig. 3. Fortunately the rivets did not entirely separate from the holes in the plates, but held until the man was able to lower himself down to a safe place.

Another case in mind, in which the work was in process on a stubble stone and cement chimney, is such as shown in Fig. 4. The stack held securely, but the staging, which had been built up from the level of the earth with two-by-two and two-by-three strips, gave way. Its upper cross pieces were not securely nailed, some of them wrenched free under the strain, and before he was aware of what was happening the workman dropped downward until he fell among some remaining cross pieces, and was eventually rescued by men who went

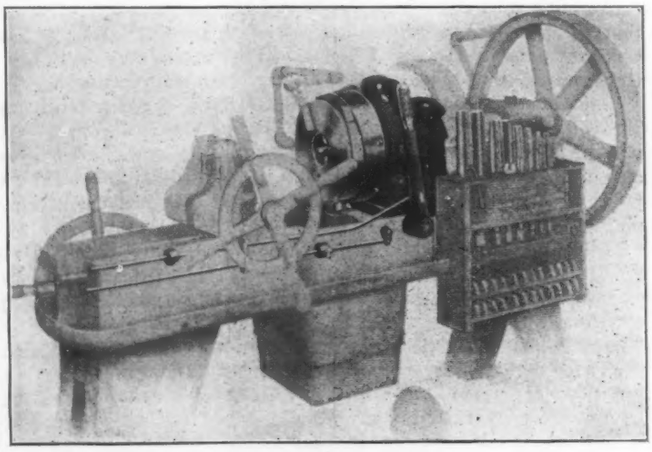


up with ladders, hooks and ropes. The workman escaped in this case with a broken shoulder.

No doubt in time men who devote their lives to working on tall spires will invent processes by which they can as safely ascend the immense modern structures as they ascended the smaller, old time chimneys. These men, who are brave, ingenious and, as a rule, caretaking, derive a good income from their work, and oftentimes do a vast amount of good to the structure they clean out, overhaul or paint.

The Improved "Little Giant" Bolt Cutter.

The manufacturers of the "Little Giant" bolt cutter, nut tapping and pipe threading machine, which has for some time been manufactured in the shops of the Wells Brothers, announce an improvement in this useful device which will commend it all the more to those in need of such a device. The automatic opening die head is now furnished on all the 1, 1¼ and 2-inch machines, and, although automatic, the heads can be opened and closed by hand, as heretofore, when desired. The automatic opening and closing of the head is governed by the movement of the vise carriage forward and backward. The essential features of the device are the cam ring, with knock-out projection on the outside of the head, the upright spring stud in the web



under the head, the releasing rod which extends horizontally through the web from the spring stud to the outside of the bed, and the long rods carrying the set stops at the side of the bed. When the head is closed and the dies are cutting, the upright stud under the head is held within the supporting web, so that its head is just flush with the top surface of the web. This stud is mounted on a spring and is held down in the web by the releasing rod; when the rod support on the vise carriage strikes the set stop, the small crank at the end of its long rod is thrust forward. As this crank is mounted on the end of the releasing rod in the web, its forward movement turns the releasing rod. This releases the upright stud, which springs upward. The

stud is so placed that it springs up just in front of the cam ring at its narrowest point; then one revolution of the head with the edge of the cam ring bearing against the revolving stud forces the head open and brings the knock-out projection around to the stud, which is forced down into the web and there locked again. The rod extending from the hand lever to the end of the bed parallel to the knock-out rod is also provided with a set stop, and serves to close the head automatically as the vise carriage is run back. The construction of the yoke over the back of the head has been made stronger. The yoke is linked to the yoke support at the top and to the two forks on the lever shaft at the bottom, with a toggle joint in the middle at each side. The yoke carries two segments, one on each side of the head, which fit into the groove in the back of the head. This form of construction is designed to give ample power for instantaneous action. All that is now needed is to put the work into the vise, set the stops, and, according to claims, the machine will do the rest, insuring not only uniform accuracy in diameter, but in length as well. Blin holes can be tapped in work held in the vise to good advantage.

Growth and Magnitude of the Electric Industry, as Shown by the Current Report of the Census Bureau.

The magnitude of the central electric station industry in the United States, in the census year 1907, as compared with the census year 1902, and the growth during the intervening 5-year period, are shown in the Census Bureau's special report, now in press, on the second United States Census of the central electric light and power stations for the year 1907, prepared by William M. Steuart, Chief Statistician for Manufactures, in conformity with the act of Congress of June 7, 1906, requiring the collection of such statistics at 5 year periods.

The central electric stations are defined in the report as those which, exclusive of isolated electric plants, furnish electrical energy for lighting and heating; and power for manufacturing and mining purposes, for street railways and elevators, for charging batteries, etc.

Two Classes of Central Stations.—Central stations are classed as "commercial" and "municipal;" the former being those operated under private ownership, whether by individuals, companies or corporations, the latter being those operated by State, city or other local governments, except those operated espcially for institutions. The central stations are further classed as "purely electric" central stations, or those that do a strictly electrical business, and "composite" central stations, or those operated in connection with some other industry. It is stated that the majority of the central stations are of the "purely electric" class.

With reference to the municipal stations, the report states that these plants are generally established primarily to furnish current for lighting public buildings, streets and parks. Their field of operation is, however, much like that of the commercial stations. The census takes no cognizance of electric stations operated by the Federal Government, or of those operated primarily for State institutions.

It is noted in the report that the figures given for the central stations do not represent the entire production of electrical energy. To arrive at the aggregate it would be necessary, it is stated, to consider also the electric railways, telephone and telegraph lines, electric police patrol and fire alarm systems and the isolated electric plants.

In the first chapter of the report, which is a general discussion of the subject, it is stated that the tendency to sell electricity for general commercial use is constantly increasing among electric railway companies.

In 1902 there were 251 railway companies which furnished electricity for light, power and other purposes. These companies reported an aggregate income of $7,703,574 from the sale of current. In 1907 there were 330 railway companies in this class, and the income from the sale of current amounted to $20,093,302.

The Annual Output.—In 1902 the annual output of all electric stations and electric railways amounted to 4,768,535,512 kilowatt hours. In 1907 the output of the two classes of stations was 10,621,406,837 kilowatt hours, the increase in that year as compared with 1902 being 5,852,871,325 kilowatt hours, or 122.7 per cent. In 1902 the output by electric railways formed 47.4 per cent. of the total, but by 1907 the proportion for such railways had fallen to 44.9 per cent.

Consolidations of the two branches of the industry and the growing tendency of the railway companies to sell electricity for commercial purposes are referred to in the report, which further states that the separate statistics of the central stations are, therefore, not representative of all the electrical energy sold for general commercial purposes. It is observed that during the 5 years ending with 1907 the central stations increased more rapidly than the electric railways.

Regarding the isolated plants, the report states that, for the purpose of lighting and furnishing power for factories, hotels or other enterprises, a large quantity of electricity is generated in plants which are operated for the exclusive benefit of their owners. Some of these plants sell limited amounts of current, but they were established as adjuncts to other forms of business, and practically no statistics concerning them are included in the census reports. Some of these isolated plants are extensive and have a much larger capacity than many of the central stations. At the census of 1902 it was estimated there were 50,000 of these isolated electric plants in the United States.

Great Increase in Plants.—The number of commercial and municipal plants increased from 3,620 in 1902 to 4,714 in 1907, the increase amounting to 1,094, or 30.2 per cent. The application of the same rate of increase to the estimated number of isolated plants in 1902 gives an estimate of 65,000 for 1907. To what extent the utilization of surplus power in the operation of private electric plants to furnish light and power for large mills, department stores, hotels and other industrial enterprises has stimulated the increase in these plants it is, the report declares, impossible to state, and notice is given that the estimate, therefore, may be more or less than the actual number of isolated plants in existence.

Referring to power or generating plants, the report states that the number of primary power or generating plants was not called for in the schedule used for reporting central stations in 1907, but some idea of their number may be had from the fact that the returns showed 4,731 plants equipped with dynamos for the generation of electricity. Of the 4,714 stations reported in 1907, 227 had no generating equipment, while 113 had more than one power plant. This latter class reported 357 generating stations.

There were, in 1907, according to the report, upward of 30,000 individuals, companies, corporations, and municipalities, exclusive of isolated electric plants, which reported the generation or utilization of electric current in what may be termed "commercial enterprises."

Over 6 Billions Invested.—These industries represent an outstanding capitalization of $6,209,746,753, of which amount, $1,367,338,836 is credited to central electric stations; $3,774,722,096 to electric railways; $814,616,004 to commercial or mutual telephone companies; and $253,019,817 to telegraph companies, the latter item including $32,726,242, the capital stock of wireless telegraph companies. The capitalization of the 17,702 independent farmer or rural telephone lines and of the 1,157 electric police patrol and fire alarm systems could not be ascertained. The report states that there are also excluded a number of companies organized for the purpose of acquiring the capital stock or bonds of electric companies, street railway companies, gas and water systems, and similar properties, holding the same for investment and to some extent supervising the operation of the underlying companies; the reason being that to show the capitalization of these holding companies would be misleading as applied to central electric stations, since it would be impossible to determine the extent of its application to the electrical industry as distinguished from others.

The Municipal Stations.—The report states that the municipal stations are practically exempt from the consolidations that so frequently occur among commercial companies, and this fact no doubt accounts in large part for the proportionately greater increase discovered in the former class of stations. Not only was there a large increase in the number of municipal stations, but an analysis of the report shows that, although 33 municipal stations which reported in 1902 had become commercial stations in 1907, 113 stations which were reported as commercial in 1902 had become municipal in 1907.

The report refers to the fact that claim has been made, and sustained by what appears to be reasonable argument, that the drift of these public utilities is from municipal to commercial, but it is asserted that the results of the census do not furnish corroborative evidence of this. On the contrary, there appears to be a distinct field for municipal electric stations, not only because of the feeling which may exist in many localities that these public utilities should be owned by the cities, but because many of the places in which municipal plants are located do not present sufficient inducement for the investment of commercial capital.

Domestic Installations.

[Prepared by Mr. A. HURLBURT, for Fifth Meeting, Natural Gas Association of America.]

The great bulk of our business depends on the quantity of gas we can sell for heating to domestic consumers, therefore, all natural gas companies, whether they do any installing of appliances or not, should be vitally interested in the kind of appliances in use by their consumers, and to see that these appliances are as economical as possible; moreover, an earnest effort should be made to see that the consumer is in shape to take care of himself in the way of heating, in case of a temporary shortage of gas; for, unless such is the case, there is liability of complaints and loss of business. If these few notes on domestic installation serve to bring out a solution of our problem, time will be well spent. The methods of heating homes may be classified as follows:

1. Small stoves in each room.
2. Hot air furnaces
3. Steam heating system.
4. Hot water heating system.

Of these methods, with us hot air furnaces are by far the most common. A few fundamental facts should be borne in mind in *all installations*, and they cannot be too strongly stated or enforced.

All appliances should be rigidly connected with iron pipe, and all appliances should have a flue connection to a regular chimney. A damper should be placed in this flue, which should, however, not completely close stack, and in cases of furnaces this should be placed between check draft and the furnace. All consumers should be warned against flues becoming stopped up with soot, where soft coal has been used previous to burning gas, otherwise there is liable to be complaint of leaking gas, when the real trouble is fumes of incompletely burned gas being forced back into the house and the efficiency of the appliance materially reduced.

A thousand cubic feet of natural gas under normal pressure and 60° F. weighs about 42 pounds, and when burned completely forms 95½ pounds of water; so you can readily see that, if the chimney is full of soot, it does not take long to saturate it with water, and then it falls to the first elbow in the flue, very effectually shutting off all draft.

In heating houses by individual stoves, in a great majority of cases, it has been far more economical to put aside the old coal stove and install in place a small gas heater. Where this is done, of course, people can always set up the coal stove again and are ready to take care of heating at least a portion of their houses during a temporary shortage—in some cases people have left a coal stove in one room, figuring they would only use it in case of emergency and live in the part of the house where the gas was being burned.

In the eastern portion of Kansas City many people actually have the gas stove and coal stove set up in the same room. The use of small stoves often calls for several flue outlets; but there are very few houses built which have a flue in every room, and the carrying of a flue pipe through the wall, which may be a safe proposition with coal, although annoying, is absolutely dangerous with gas, on account of the fact that the wind, blowing from the wrong direction, is liable to put the gas stove out entirely; whereas, with coal, this is practically impossible, the only result then being that dirt and that products of combustion would get back into the room.

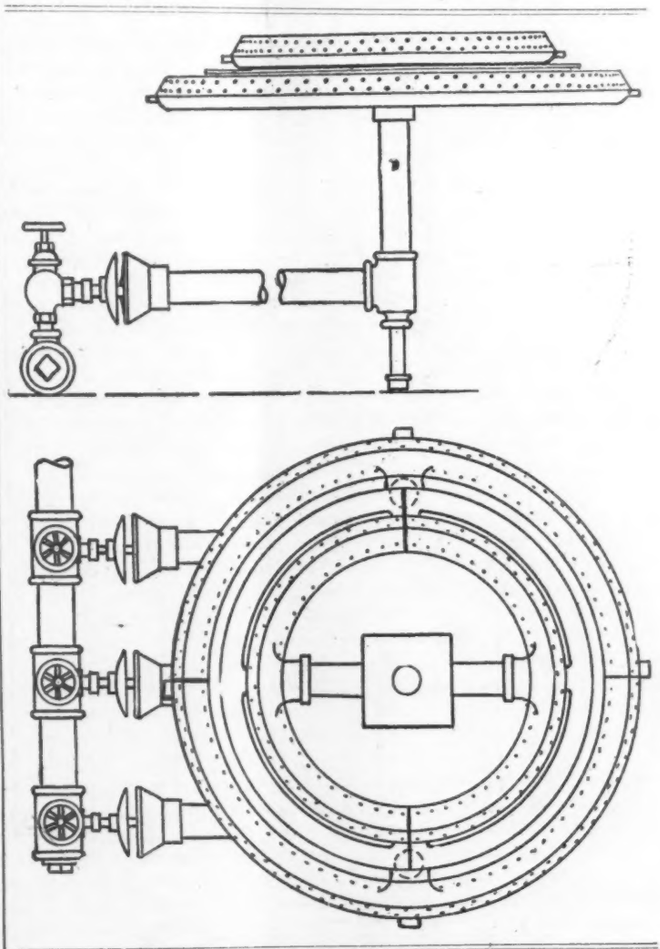
There are on the market several small combination coal and gas heaters, and possibly some of the gentlemen present can tell us something about them. We have not found any in use in our city, however. The disadvantage of heating a house by small stoves is that the floors of the rooms are usually cold, although undoubtedly if the stoves are properly handled, it is by far the most economical plan yet devised, as shown by comparing gas bills of similar houses. In places where the people prefer the old coal stove converted to gas the usual method of doing this work consists in placing a ring burner with one gas orifice in the firepot, then a certain amount of arfificial fuel is put in the firepot on the burner.

Referring to this matter of artificial fuel, we very frequently find people who fill up these firepots with all kinds of material, thinking the more they put in the greater the efficiency they will get, which frequently causes serious injury to the burner.

In Kansas City, as in most cities, I think you will find a great majority of houses are heated by hot air furnaces. This method of heating the ordinary house is used because of the cheapness of first cost of installation, which is reasonable, and it is possible to heat the average house comfortably by this method. The installation of burners in this type of furnace probably represents with us 90 per cent. of the work we have done. The question of making some provision for heating houses of this kind in case of shortage of gas is one which still remains unsolved in most cases. It is very exceptional that people want small stoves in any of their rooms where they have a hot air furnace, and I think I am safe in saying that 90 per cent. of all the mantle grates in use in Kansas City are only fit for burning a small amount of gas, on account of small flues or none at all. Therefore, some method must be devised whereby either the gas burner can be taken out of the furnace and coal substituted, or coal burned in the furnace while the gas burner is there, or an auxiliary gas furnace attached to the hot air drum.

A great majority of these furnaces have round fire bowls, but we have a few large houses in which the hot air furnace is built up with brick and use a square firebox.

Burners used in Round Fireboxes.—1. Sectional ring burners with drilled ports, made in 1, 2 or 3 sections, with constant diameter, with a double row of ports drilled on outer edge, or double row of ports on outer and inner edges. These burners are fitted with or without a center burner. Some designs can be connected to the mixers from the top door, thus leaving the grates in place. These burners are all arranged for a gas valve and a mixer to each section.

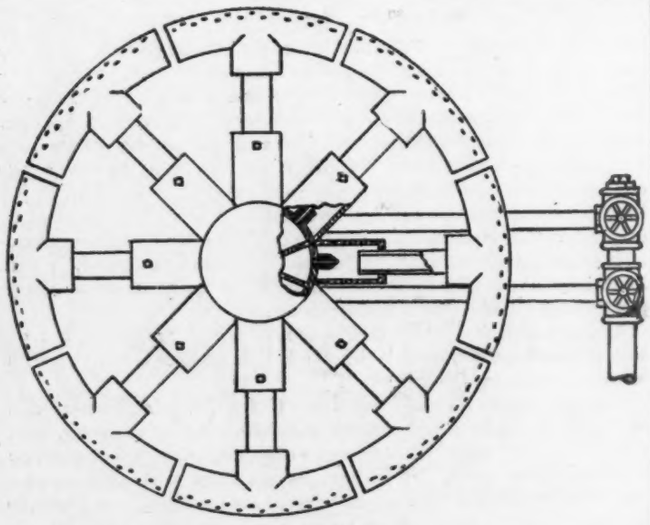


Sketch "A."

2. Rings made up of a number of small sections, which are adjusted to the diameter of the firebox, are fed by one or two gas valves into a center head, and the mixers are on a level with the burner, making the adjustment of air very difficult.

3. Two port burners with ports formed by corrugations in the outer joint, made in various sizes and shapes, allowing several sections to be put in the firebox. They are liable to warp and open the ports, causing back firing and incomplete combustion.

4. Burners in which the air mixers are formed by short pieces of pipe being held above the gas orifices on a frame, these orifices being drilled in a flat surface of a casting. The rust and ashes from the furnace collect on this burner and gradually smother the jets from

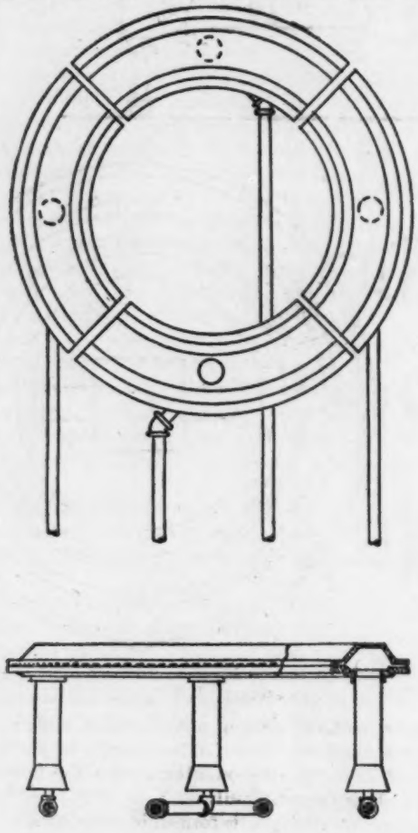


Sketch "B."

the orifices, causing the flame to jump back through the short pipe and burn in the mixer.

5. Burners in which no air mixer is used, the gas issuing from orifices directly against the fire bowl or firebrick. These burners are rather destructive to the cast iron firebox, owing to excess heat; also owing to the high ignition temperature of natural gas, the jets are liable to blow themselves out and thus allow the gas to escape unburned.

6. Burners composed of an air mixer and orifice and a piece of pipe arranged to blow a jet of gas into red hot firebrick, known as "blow burners." The brick may be arranged in various ways to so concentrate the flames that none of the gas will escape unburned.

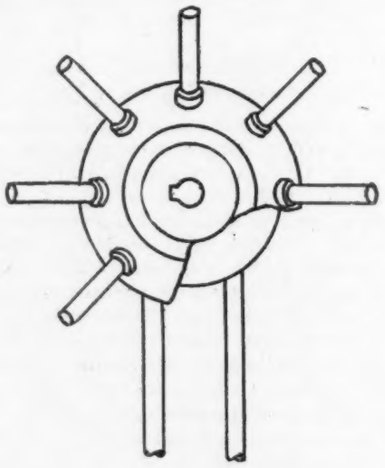


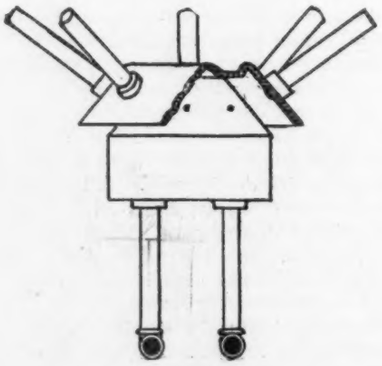
Sketch "C."

Owing to the fewer number of hot water and steam plants in which rectangular fire boxes predominate, only a few designs of burners are used in them.

A. Cast iron drilled multiple square sectional burners.

B. Cast iron sectional two part with corrugated surface to form the ports.

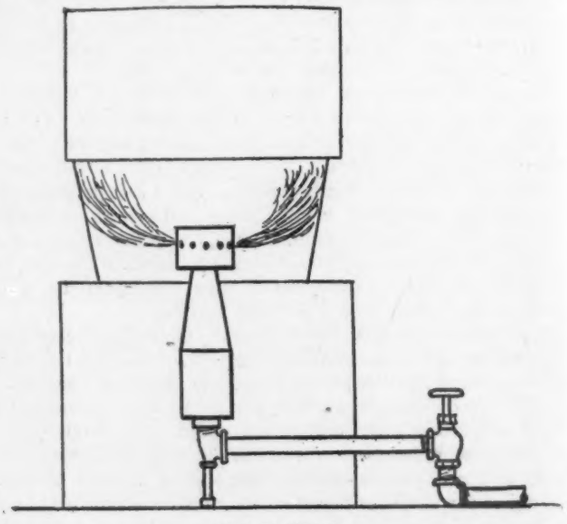




Sketch "D."

C. Blow burners with brick checker wall or arch to cause perfect combustion and thoroughly mix the gas. (And as the principle involved is the same as with round furnaces, I shall make no further comment on square furnaces.)

In Kansas City, when figuring on heating houses, we estimate, first, on the amount of gas needed, allowing approximately 100 cubic feet for each burner, or 100 feet per square foot grate surface, the

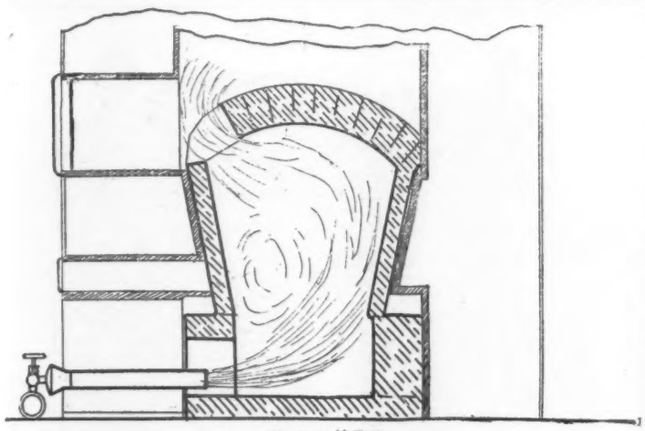


Sketch "E"

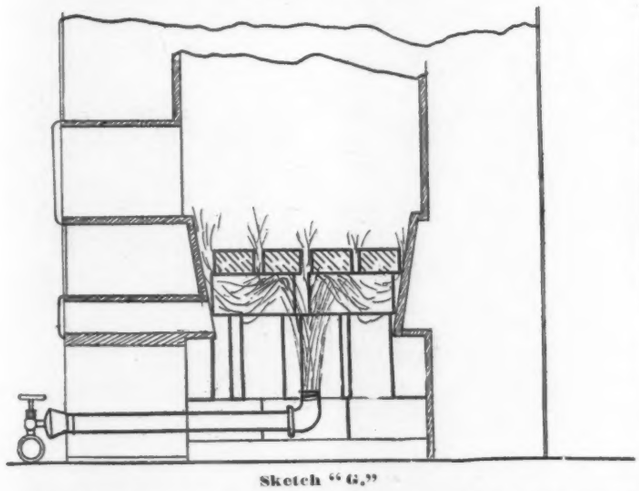
size of service necessary allowing not over 5-tenths drop in water pressure from main to meter. The meter capacity is the next to consider, and as a general rule we put in a 5-A meter, on houses up to 6 rooms; in houses from 6 to 10 rooms, unless the rooms are very large, we use 10-A meters. The capacities of "A" meters are as follows, under about 3-tenths loss of water pressure:

5-A meter.....	175	30-A meter.....	860
10-A meter.. ...	375	60-A meter.....1,600	

We never use anything less than a 5-A meter where any heating is



Sketch "F."



Sketch "G."

done. After the meter we try to see that all piping to a furnace is such that there will be only about .2 loss of water pressure from meter to furnace, and, generally speaking, this means an 1¼-inch or 1½-inch pipe for the average house.

Sizes of Pipe to Supply Heaters.

	Length Ft.	10 Rooms or Under, Ins.	11 to 15 Rooms, Ins.	16 to 26 Rooms, Ins.
Heater.....	Under 75	1¼	1½	2
Only.....	75 to 150	1½	2	2
Heater.....	Under 75	1½	1½	2
And range.....	75 to 150	2	2	2½

Sizes for runs for heating other buildings and power plants we insist should be taken up directly with the company, to insure satisfactory service, and we make the plans for piping, giving the plumber the sizes of pipe required. We are very strict on this question of pipe sizes, will not pass plumbing jobs where pipe schedule is not lived up to and refuse to set a meter or turn on gas until job is approved; so we have very little trouble now with small pipe.

In Kansas City we started to use nothing but ring burners of the first type, with double row of holes drilled both on the inner and outer edge, and made in two or three sections. To install these burners we take out the grate and ash door, then put burner in place, supporting it above the position of the grate by means of legs extended down to the floor. A loosely fitting sheet of tin is placed directly under the burner to keep burner from getting too much air and reduce the draft. This allows air mixers to work properly.

This type of installation has given entire satisfaction in most cases, but we have found that we often had to do considerable experimenting to find just the right height to set these burners in different makes of furnaces, for the question of the use of artificial fuel is one that has caused any volume of trouble. Some furnaces gave best results without any fuel, others seem to work well with a small upright tile set around the burner. Several large, flat tile, leaning from center burner to edge of furnace, causing a retarding action to gases, or a combustion chamber in firepot, have in some cases worked very well indeed; but the throwing of old brick or artificial fuel on burners to a depth of 6 to 12 inches is positively detrimental, causing the burners to float and also ruining them in very short time.

We found that this burner was not always satisfactory, particularly where a furnace was too small for the house, or in fact in very large houses; for it was impossible to burn sufficient gas to keep houses warm In such cases we resorted to the blow burner type of installation with the tight arch, and found this worked very well indeed. I think the sketch given herewith shows plainly the general scheme of this installation. I am rather backward about recommending this installation very generally on account of its inaccessibility; that is, the fire cannot easily be seen and care must be exercised in lighting. There is only the small place in the top front part of the arch through which a lighted taper or paper can be introduced to light this burner. Both of these installations are open to the objection that they are hard to take out and the grate must be replaced. However, we have a great many in operation in Kansas City that, put in three years ago, have never been removed.

Large sections of our city have never beeen so badly affected by low pressure that people felt it necessary to make any change, but in other parts of the city, where there has been cause for complaint of low pressure, many people have put up with the cold and lived in one or two rooms with a small coal grate or other stove and left the furnace alone. These types of installations are, however, very liable to cause much trouble, and the consumers much suffering, if there should be a comple shutdown of the lines, due to a break, unless the consumers have arranged some other way of taking care of themselves.

In all our installations care has always been taken to see that a damper is put in the flue pipe, and this should be placed between the furnace and check draft, otherwise the fumes from the furnace are forced out of the check draft when damper is closed too far. We have in use every conceivable type of burner made; but I think they are really all covered in my general classification.

The second class of burners that I speak of is practically like the first class, except that the air mixers are placed so they cannot be adjusted without taking the burners all apart.

The third class of burners is quite similar to the first, except for corrugation in castings in place of drilling, and the large flat surfaces exposed are much more liable to warp than the burners of the first class.

The fourth class is a burner not very generally used, and is one with which we have had quite some trouble, due to stopping of holes; then again, this burner is often covered with artificial fuel and the mixture of air and gas must of necessity be very uncertain.

Burners of the fifth class need no special comment, as we all know that, for heating, the better mixture of air and gas that is made, the better the combustion; and the shooting of a pure gas flame directly against any part of the furnace is to be avoided.

As to hot water or steam installations, we use practically nothing but blow burners with a checker wall or loose arch, and have found it the most satisfactory installation that we have yet tried. These same types of burners have been used in the working out of combination furnaces, or furnaces where the burners can be easily removed and coal used. For instance, the first type of burner, used in two sections, has been placed in many furnaces through the stoking door on a swing-joint, and burner set upside down on a brick, set on top of grates. The stoking door is replaced with a tin door, fitting over the pipes, to shut off air. The air mixers are then at the stoking door instead of ash door.

These burners are pulled out in case of shortage of gas and coal is used. The change can be made in a very few minutes. With this arrangement the fire will flash back under higher pressure than will be the case when burners are installed with gas coming from below, but this objection causes very little annoyance.

Several furnace builders are now inserting a ring in the fire bowl. That is, the ring fits between the furnace castings and cannot be removed. This ring is in some cases placed near the grate, in other furnaces up near the stoking door. Sometimes the holes are so drilled that the flame shoots straight out to center of firepot, while other makers drill the rings so the flame shoots downward alongside of fire bowl. In all these styles of furnaces the mixers are on the outside of furnace, at sides of same, and are of good design, except they are inconvenient to light, as the operator cannot watch the burner while turning the valve. Some makes of furnaces can be changed to combination, from the old furnaces, at comparatively small figure, by inserting this ring between upper and lower section of fire bowl of furnace and then lengthening the sheet metal jacket.

Some of the drawbacks to these furnaces are that they are not as economical with gas as other types of burners, especially after coal

has once been used, for dirt will get into the holes and they will corrode and warp out of shape, especially when drilled on the horizontal. The rings will warp with coal fire, if they are set too low, and even if they are higher up they will warp if a rapid, hot, wood fire is started or coal is piled up too high. The objection to putting burners up so high is that all the surface of the fire bowl is practically lost for radiation purposes. Certain types of blow burners are quite frequently put in the stoking door of furnace to burn gas and are swung out when the gas is short; but all furnaces of a combination type, except possibly the building of an additional furnace for gas only, and attaching it to the hot air drum of the old furnace, are open to the objection that they are not quite as economical as are installations put in with the idea of burning gas only.

This question of economy in house heating, in burning gas, is a very hard one on which to get much information. I have gathered a lot of data on houses of the same kind, with installations almost identical, yet bills would vary so much that comparisons are almost useless, except to say that servants operating gas furnaces can easily double bills without any effort.

I want to call attention to the fact, too, that many times the installation of the burners is not the cause of trouble in heating houses. Very often it is in the house itself; and more often there is something wrong with the furnace. The furnace not being cleaned, or so arranged that the air does not circulate, on account of lack of headroom to give any rise from furnace to ceiling of basement, long horizontal runs of hot air pipes, etc.

Iron vs. Tin Meters.

[Prepared by Mr. A. G. Holmes, for the Fifth Meeting, Natural Gas Association of America.]

The writer fully appreciates the honor conferred in being selected by the officers of the Natural Gas Association of America to write a paper on the subject of Iron vs. Tin Meters, and in accepting this very pleasant task, has assumed that it is not the intention of the Association that a history of the tin meter be given inasmuch as that has been the subject of previous papers by other writers, but a comparison of the merits of the two types of meters, the decision of the matter to be determined by the users of the meters after hearing or reading the paper and its discussion, which latter it is hoped by the writer and no doubt by the officers of the Association will be participated in by a large number of those present.

It has, however, occurred to the writer that a detailed description of the tin meter as well as the iron may be of interest to the members, not only those who hear the paper, but also those who may perchance read it, before or after the meeting, and it has seemed best to follow the course of the gas through the meter from inlet to outlet, taking up each part and the office it performs.

Tin meters of the present form have been made in the United States for the past 50 or 60 years without material improvement except as to increased capacity and the art of manufacture. Illustration No. 1 shows the exterior view of a regular tin gas meter, the parts of which are known by the following names:

No.		No.	
1.	Top.	34.	Flag arm post.
2.	Front gallery plate.	35.	Valve.
3.	Back gallery plate.	36.	Valve seat.
4.	Front case.	37.	Valve guide.
5.	Back case.	38.	Valve guide wire.
6.	End plate.	39.	Valve link.
7.	Bottom.	40.	Valve post.
8.	Index box.	41.	Valve post pin.
9.	Index box cover.	42.	Meter screw.
10.	Name plate.	43.	Inlet pipe.
11.	Dial glass.	44.	Outlet pipe.
12.	Union nut.	45.	Gallery bottom.
13.	Plain swivel.	46.	Crank shaft plate.
14.	Threaded swivel.	47.	Valve chamber front.
15.	Dial only.	48.	Valve chamber cover. (Not shown.)
16	Index, complete.		
17.	Horizontal axle.	49.	Diaphragm disk.
18.	Horizontal axle bearing.	50.	Disk guide.
19.	Horizontal axle wheel.	51.	Disk guide wire.
20	Crank shaft.	52.	Guide wire bearing.
21.	Crank shaft worm.	53.	Rocker shaft, complete.
22.	Crank shaft top bearing.	54.	Flag.
23.	Crank shaft stuffing box.	55.	Flag wire.
24.	Crank shaft stuffing box cap.	56.	Flag wire step bearing.
25.	Tangent.	57.	Leather diaphragm.
26.	Tangent nut.	58.	Inlet channel.
27.	Tangent post.	59.	Diaphragm channel. (Not shown.)
28.	Tangent post pin.		
29.	Backstop.	60.	Outlet channel, complete.
30.	Flag wire stuffing box.	61.	Partition.
31.	Flag wire stuffing box cap.	62.	Valve chamber.
32.	Flag arm.	63.	Inlet to valve chamber.
33.	Flag arm link.		

Fig. 1.

Illustrations No. 2, 3 and 4 clearly show the interior construction, the parts of which are as given in Nos. 1 to 63.

Referring to illustrations Nos. 2, 3 and 4, and assuming the meter and lines are full of gas and an outlet or opening has been made in the consumer's house, gas entering at 13 from the company's main passes through the meter screw, into and through a channel 58, attached to the underside of gallery bottom 45, into the valve chamber 62, by the opeging 63, into the four compartments made by the two diaphragms 57, the partition 61, and the front and back case 4, illustration No. 1.

The difference in pressure caused by opening the house valve causes the diaphragms 57 to expand and contract, thereby moving the valves 35 to and from the center by the movement of the flag 54, the flag wires 55, flag arm 32 and flag arm links 33, thereby rotating the tangent 25 and crank worm 21. The worm 21 in turn revolves the horizontal axle wheel 19, which communicates its motion to the clock or index 16, the amount so passed being registered on the dial 15.

Under each valve or cover is a seat 36, having three openings, one to the inside of the diaphragm, on the side of which the seat is located, by the channel 59, one opening to the outside of the diaphragm directly through the gallery plate 45 and inside the outer case, and a central opening to the outlet of the meter by the channel 60 to the outlet pipe 44.

Illustration No. 5 shows a section of the valve *A*, from which it will be clearly seen that it is hollow on its underside, which hollow space is of sufficient area to cover one of the inlet ports *C* or *C*', and at the same time part of the outlet port *B*, which will be noted always gives free valve area. In this position gas is passing from one of the compartments under valve *C* to the outlet *B* in the seat, thence to the outlet of the meter by way of the channel 60 and outlet pipe 44 (illustration No. 4), at the same time gas is passing into the other compartment through the other opening of the valve seat *C*' (illustration No. 5). This opening, *C*' (not lettered), can also be seen in illustration No. 2 near 36. The inlet pipe 43 serves to collect condensation, etc., while part of the outlet pipe 44 serves the purpose of communication between the outlet channel 60 (illustration No. 4) and the meter connection. These pipes 43 and 44 may, when desired, be made much shorter.

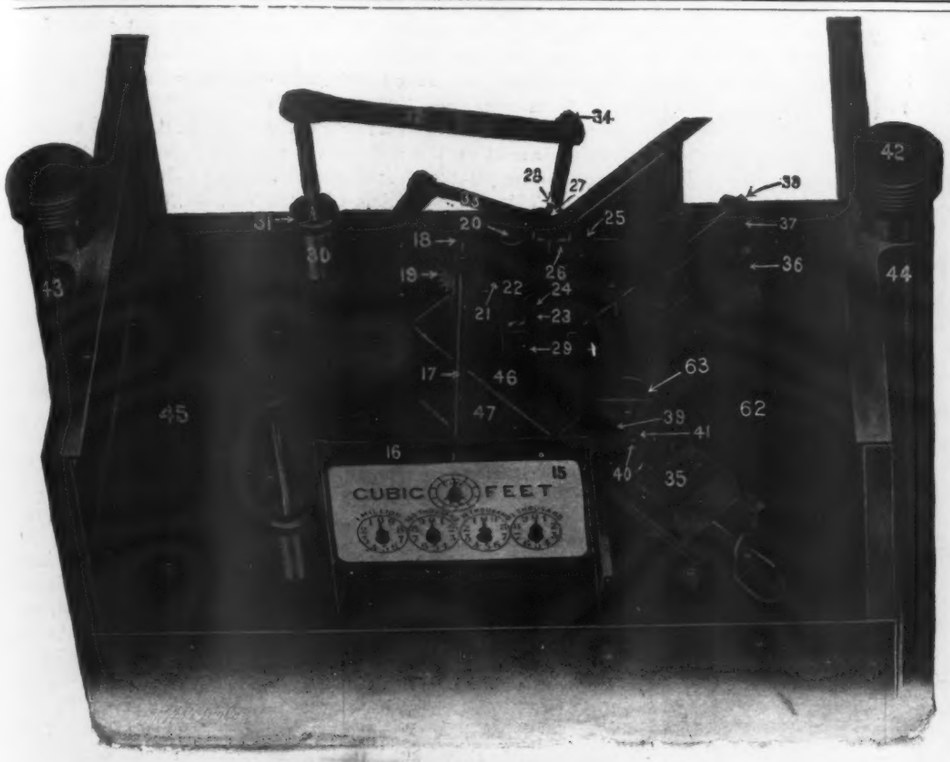


Fig. 2.—No. 43. Inlet Pipe.

Fig. 3.

Adjustment is made by either shortening or lengthening the stroke by the tangent and nut 26.

No gas is supposed to be present in the gallery between the top 1 (illustration No. 1) and the gallery plate 45 (illustration No. 2), except in what is known as the open top meter, in which gas enters the gallery direct from the pipe 43, and in which the valve chamber cover 46, 47 and 48 is eliminated.

In the regular tin meter a stuffing box is provided at 30, on each side and at the under end of the worm at 23. In the open top tin meter the stuffing box 23 is eliminated and one placed at the back of the index 16; the stuffing box spindle in the open top meter travels much slower than in the regular meter at 23 and can, therefore, be made more permanent.

In prepayment meters an attachment is made whereby a coin releases a certain amount of gas, to the value of the coin, by a series of wheels which alternately release and close a valve in the prepayment attachment.

The tin parts of these meters are usually stamped from sheet tin by powerful presses, and the valves, seats, etc., cast in metal moulds from white metal, the valve and seat being of different mixtures.

The diaphragms are made from full sheep skin, first cut in strips and these strips sewed together—the stitches not going through the leather on either side, the leather ring thus formed is attached to a tin ring on either edge; these rings are in turn soldered to the partition 61 on one side and the diaphragm disk 49 on the other. These diaphragms are supported by the flag 54, which is rigidly attached to the flag wire 55.

The motion of the diaphragms is on a straight horizontal line at right angles to the partition.

The valves used in tin meters are known as D slide valves and are admitted by all engineers to be absolutely the best form for gas meter purposes.

At the time of the introduction of natural gas into Pittsburgh, about 1880, tin meters of regular make were used, for some time, to measure the domestic distribution and when made of heavy tin and carefully soldered joints would, when new, safely withstand working pressure of about 5 to 10 pounds, but would bulge on higher pressures. The worm stuffing box, however, was and still is the greatest

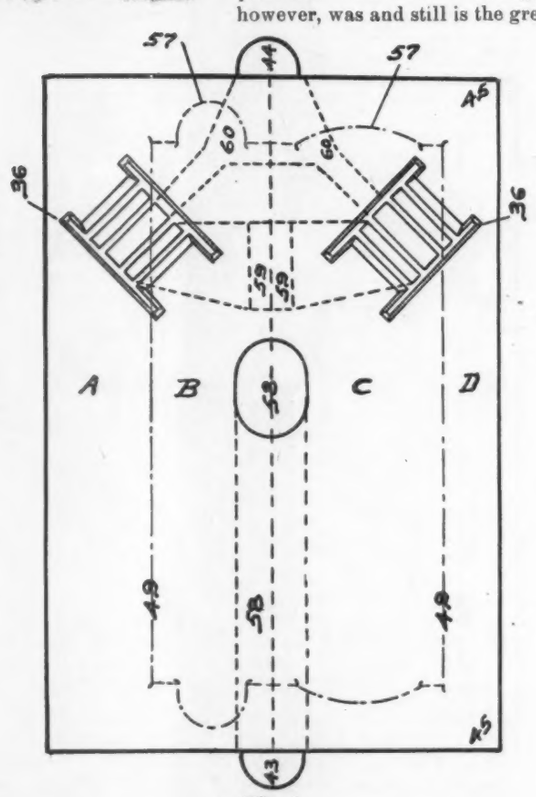


Fig. 4.

obstacle to using them on pressure of more than about 4 ounces, and for this reason particularly the attention of manufacturers and inventors was, about the year 1886, given to the matter of a suitable gas meter with cast iron or steel outer case, because excessive leakage was liable to cause not only great damage to property but loss of life as well. It was, therefore, considered advisable to use meters of stronger construction, such as cast iron, on account of the uncertain pressure and due to unfamiliarity with the natural gas business. No meters of this kind being available in the open market, the Fuel Gas and Manufacturing Company, a Westinghouse corporation, later succeeded by the Pittsburgh Meter Company, developed and manufactured the Westinghouse fluid meter, which was put on the market about 1887 in sizes ranging from 200 feet to 40,000 feet per hour.

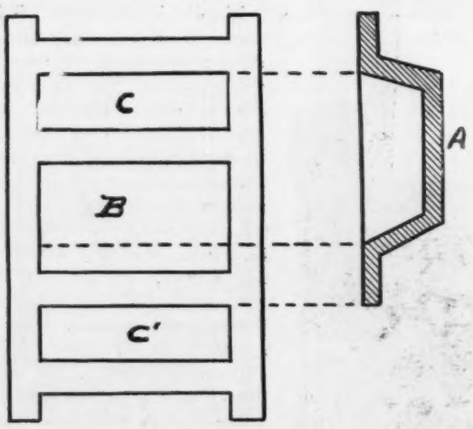


Fig 5.

Illustration 6 shows this meter in sections, its operation being as

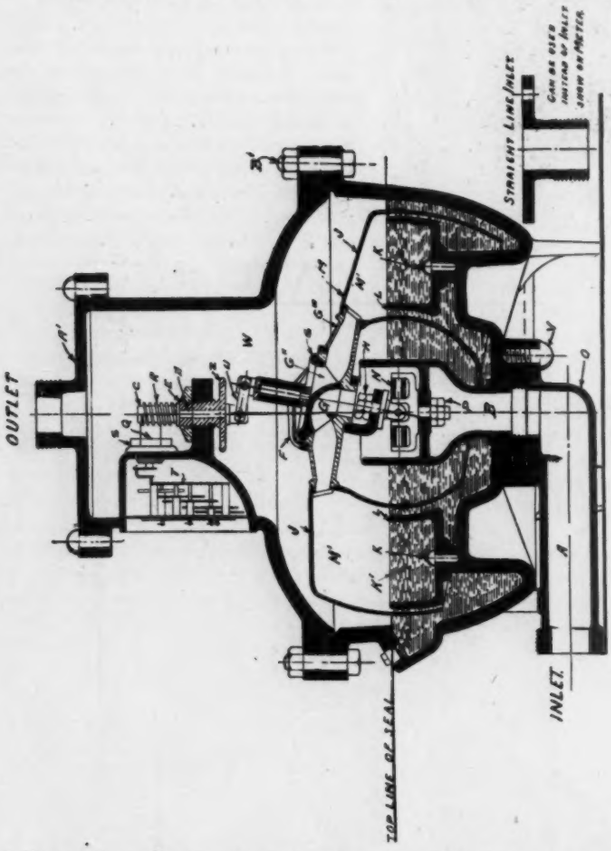


Fig. 6.

follows: Gas entering at *A* passes up through the center cup *B* through the valve section *G'''* under the inlet of the valve *G* to the compartments *M'* between the fluid *K'* and the top of the drum *M*, a difference in pressure being created between *M'* and *W*; the drum notates on the universal joint *N*, causing the valve *G* to revolve, bringing its inlet *G'* and its outlet *G''* alternately in communication with the six ports of the valve section *G'''* thereby filling and emptying the spaces *M'*. The motion of the drum is communicated to the register by the link *U*, worm *R* and worm wheel back of *R* (not shown).

Adjustment is made by lengthening or shortening the swing of the drum by lowering or raising the shaft *D* by means of the adjustment wheel or disk *Z*, it is then locked by the nut *E*.

The seal in this meter performs the same office as liquid in a gasometer, preventing gas from passing around the outside of the drum *M*. This meter when properly used is very durable and accurate, and on account of its durability is especially desirable in proportional meters as a tally.

In a short time, dry gas meters with cast iron castings began to appear on the market and largely superseded the liquid meter, owing principally to being more convenient and lower in price; they are, however, not as accurate as the fluid meter. Several forms were consecutively put on the market, the life of which varied, probably the first being known as the metric, made at Beaver Falls, Pa., under patents of Culmer, June 3, 1890. This is a 1-diaphragm single acting meter, a weight being used to carry the diaphragm over the center. Probably the next on the market was the Tobey, made by the same company, under patents of December 13, 1892, by Dr. Tobey, then of Toledo, O. This meter consists of three diaphragms and a rotary valve, and is single acting.

After these came the Equitable, a 5-diaphragm single acting meter, adapted after the carbureter patent of Hyams, March 3, 1880. The Sprague 1-diaphragm single acting meter of 1895 patent, which used a spring to carry its diaphragm over the center, the Keystone under patents by Pudam, January 17, 1894, the Sprague 2-diaphragm meter with three compartments and a rotary valve patented March 10, 1903, and the latest, the Ironclad, patented September 7, 1909, a 2-diaphragm double acting machine with two D-slide valves, the same as used in tin meters.

Messrs. Henly and Fulgham, of Richmond, Ind., made a few meters under their patent of October 23, 1894, a 2-diaphragm double acting machine with a rotary valve, but few were made and it is now practically unknown.

What has been needed for 20 years, and no doubt has been aimed at by all inventors and manufacturers, is a 2-diaphragm, double acting cast iron machine which can be made at a marketable cost, and include the features found only in tin meters, viz., sensitiveness on small volumes of gas and large capacity with slight absorption of line pressure, combined with durability and low cost of maintenance. Some of these features have been secured to a certain extent in perhaps one or two of the cast iron meters on the market prior to 1908, but unfortunately they have been lacking in one or both of the most important features, viz., sensitiveness and large capacity with slight absorption of pressure; however, in the spring of 1908, a cast iron dry meter of 2 diaphragms, double acting, with 2 D-slide valves, was put on the market, which not only includes all the desirable and essential features of the tin meter, but has a cast iron outer case and is so simple in construction that its maintenance is practically nil. While this meter has probably become better known in a short time than any meter ever offered the gas trade, a brief description of its construction and operation will, I trust, be interesting to the members of the Association.

It is made up of five principal parts, of cast iron (illustration No. 7),

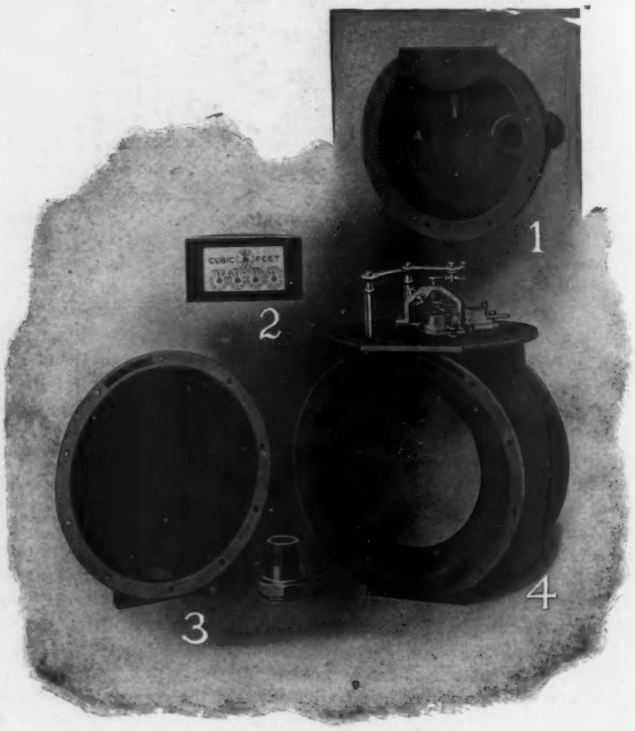


Fig. 7.

viz., top or case cover 1, register box 2, front and back cover 3, and main or center case 4, all similar in purpose to the same parts of the tin meter.

Illustration No. 8 is an exterior view showing all the outer parts including the loose connections, seal wire, seal, etc.

Fig. 8.

The interior working parts are shown in illustration 9, and are so

Fig. 9.

nearly like those of the tin meter that a detailed description seems unnecessary except to mention that the inlet is in direct communication with the valves, the channel and valve cover necessary in a regular tin meter having been eliminated; there is, however, no chance for leakage as in an open top tin meter.

The course which the gas takes through this meter is identical with that of the tin meter, and the adjustment is the same, but it will be noted by illustration No. 9 that what corresponds to the flag 54 (illustration No. 3) in the tin meter is on the inside of the diaphragm in this meter in place of on the outside as in the tin meter. The flag in this iron meter is supported by an arch (illustration No. 8), whereas in a tin meter the flag itself carries the diaphragm. This is a decided and very important improvement, inasmuch as it permits removal of a diaphragm without any interference whatever with the flag and eliminates the flag wire bearings found in the tin meters. In place of requiring the services of an expert tinner to remove the diaphragm, it is only necessary to remove a small nut, when the diaphragms and diaphragm tins can be readily removed from the flag.

The simplicity of this iron meter is clearly shown in illustration No. 7, in which the front and back cover, diaphragm, case cover and register box have been removed, leaving the entire working parts of the meter attached to the center case, in other words, to gain access to the working parts and without taking them from the meter it is only necessary to remove the outer castings and while this is a very simple matter to the meter repairer, it cannot be done by the consumer because suitable seals are provided to prevent it. This form of iron meter is particularly well adapted for a proportional meter tally when a dry meter is desired.

While the foregoing may not appear pertinent to the subject of Iron *vs.* Tin Meters, it has seemed to the writer necessary to outline the principles and make up of at least one of each kind in order that an intelligent comparison may be made.

For many years the tin meter has been the standard for the measurement of any kind of gas provided conditions were such as to permit of its use, and it has been the standard because in selecting a meter, the gas man should always consider at least two important features, viz., capacity with a given drop of pressure and sensitiveness.

Capacity, without considering drop of pressure, means nothing whatever perhaps to those who want to drive their meters at a certain speed without any reference to accuracy and the life of the meter and without reference to the amount of line pressure the meter is absorbing, but when the time comes that any amount of pressure is not available, the gas man must then consider absorption of pressure whether he cares to or not, and it has been demonstrated in the past 20 years of the natural gas business that this time comes to practically all natural gas companies. The wise man, therefore, considers it in the first place.

On June 12th, 1906, the writer read a paper at the first annual meeting of the Natural Gas Association of America at Kansas City, Mo., on the subject of Gas Meters for Domestic Consumers, in which he upheld the tin meter. After 4 years he would still be of the same opinion provided nothing had been produced to equal or excel the tin meter, but that has been done by the iron meter referred to, for both natural and artificial gas, and what was then said of the superiority of the tin meter over iron meters can now be said of the cast iron meter referred to herein, over other iron meters and the tin meter, with one exception—*i. e.*, the tin meter is lighter and, therefore, easier to carry about; on the other hand, this iron meter is stronger and safer, so that it really excels the tin if it includes all the good features of the tin, which it does. In the discussion of the writer's 1906 paper the speed of the Type A tin meters was commented upon. After 4 years the writer can say the Type A is a decided success, and as this iron meter is not faster in operation, notwithstanding it could be, owing to its rigid construction, it must also be a success.

The decision of the question, iron *vs.* tin meters, seems to resolve itself into a consideration of the objections to both types from the natural gas man's standpoint, especially as far as this Association is concerned, and I venture the following objections may be made to tin meters by the average natural gas company manager:

1. They are not strong enough to constantly withstand the average natural gas pressure for a reasonable length of time.

2. They cannot be set up with stiff iron connections without great care.

3. The tin will corrode, especially where it is dinged or set in a damp place.

4. They require an expert meter man to repair.

5. Unless especially made with extra heavy working parts they will not stand up against the extra work due to large consumption of natural gas as compared with artificial gas practice.

6. The connection screws are too easily pulled apart.

7. They cannot be used outside the consumer's house. And the following objection to an iron meter, provided it is equal in every respect to the tin meter as to the gas company's requirements. None.[1]

The Future of Gas for Store Lighting.

[Prepared for the last meeting of the National Commercial Gas Association, by MR. R. R. YOUNG, Newark, N. J.]

The possibilities of store lighting with gas have never been so bright as at the present time, in spite of the introduction of the tungsten lamp, with its widely advertised advantages of three times the light, for the same cost, and other attractive features; and there is no reason why gas illumination cannot keep in the lead if we look after the business in the right way.

The inverted type of incandescent burner, whether it be the reflexolier, cluster or arc unit, has placed the gas business further in advance in the lighting field than ever before, and the future prom-

1. Illustration No. 3 represents the diaphragm of old-style tin meter. In the A tin meter the diaphragms do not touch the case at any point.

ises improvemc nts in the different forms of burners that will give greatly increased efficiency. There is the high pressure, inverted, incandescent burner, which is now being used abroad, of different sized units; the 100, 1,500 and 4,500-candle power lamps, having an efficiency of 50 to 86 candles per cubic foot of gas, while the present inverted type of lamp, on low pressure, only gives us from 25 to 30 candles per cubic foot. Several installations of the 100-candle power, Keith, high pressure burner have been made in London, one of which is in the "Punch" office, of 350 lamps, and another of 215 lamps, at No. 104 Fetter Lane. The former installation was supplied with gas off the high pressure main, while the latter was supplied with gas from an independent compressor, run by a small gas engine. This shows that the manufacturers are not standing still and that we can look for rapid advances that will give our customers more light at a smaller cost, although the United States is a little slow in experimenting along these lines.

When we compare the illumination given by the inverted type of incandescent gas burner with the diffusing shade, and the inverted arc with the most efficient form of electric store lighting, and find that the ratio of cost is from two to three to one in the favor of gas, we must conclude it might be due to some other cause than that of economy, if we do not hold and increase our lighting business.

It is to the continuance of this superiority that we must look to holding our share of the lighting business. This, together with proper maintenance, will keep us well in advance of all competitors. We cannot expect the merchant to know as much about the lighting business as we do, and we should follow up any lighting appliance that is installed by us, whether on a rental or sale plan. In towns where gas and electricity are sold by competing companies, the rental and maintenance plan obtains and holds the business far better than sale and maintenance, for the following reasons:

We have found, from experience, that maintenance contracts for gas arcs taken at the time of sale, are frequently given up by the consumer on the plea that he can do it cheaper. This applies to the smaller stores, especially in the suburbs of New York, where there are so many peddlers selling cheap mantles. The result is that, before long, the storekeeper has poor light, for he has a fixture that he does not understand, and so is an easy prey to the convasser interested in installing other forms of lighting.

The rental plan is also a positive check on the maintenance service, as a consumer is not going to pay for service he does not get, and as he has no investment, the company is apt to hear from him very quickly if the service is not up to the right standard, and as a public service company is really selling service, light and illumination, the continuance of the maintenance is essential. Some argue that, as the merchant who rents a lamp has no investment, he is likely to be an easy prey to some other form of lighting. I think this is not so, for if a customer who has been won over, on account of having no investment to make, finds that he is getting far more and a better light, he is not going to change; again, where the merchant has an investment in gas fixtures, the company is not likely to hear of any change until the indexer is sent to reread the meter on account of the small gas consumption; whereas, on the rental plan, the gas company will get a notice to remove the lamps, and thus has a better chance to argue the matter with the merchant for pr venting a change to some other form of lighting.

The rental plan would be a great help in getting the business of the large department stores, as no investment is necessary to try out the experiment. We are better fitted than ever to meet their needs, now that we have the inverted type of arc lamps, throwing the maximum amount of light downward at an angle of from 45° to 60°, and no unsightly reflectors to mar the symmetry of the lamp.

This plan is also a protection against the peddler who sells cheap and inferior inverted burners and arc lamps which will not be maintained by the gas company. Also, it is effective in preventing the installation of systems of gasoline lighting, a serious menace to both the gas and electric business. In towns where the lighting company controls both the gas and electric lighting, and so is able to bring about the best illuminating results for the customers, the rental plan is not quite so necessary, especially if a proper maintenance system is kept up.

In Newark we advocate the placing of both gas and electric lighting fixtures of the most approved type in all stores, as this is bound to raise the standard of illumination, for on dark and busy days we are able to get a large income from our customers when two sources of light are used.

We sell reflexoliers, cluster lamps and gas arcs on a liberal time contract of $2 down and $1 per month, and maintain them at a rate of 25 cents per month, with two inspections a month, but are contemplating increasing these inspections to three, so as to give a more efficient service.

Every effort should be made to keep up the character of the store lighting in the territory served by the gas company. A well-lighted store is the best advertisement the company can have, and the storekeeper will remain a consumer just as long as he is satisfied that he has the best lighting for the least money, so it is absolutely necessary to employ men and train them for store work. While in large cities the gas company can afford to employ an illuminating engineer to superintend the different installations, the company in the smaller towns cannot; therefore, it is necessary to have high-class men and educate them in the science of illumination, so that they can intelligently lay out a lighting scheme. Salesmen having a good appearance and address are big factors in pushing gas sales, as these qualities inspire confidence in the buyer. The salesman must be able to answer all the objections to the use of gas which will be raised by the competitor, such as heat during the summer months, injury to the stock by heat and products of combustion, blackening of the ceilings, vitiation of the air, the difficulty in judging color of goods, health of the clerks, etc.

The solicitor should also have a good working knowledge of electricity as applied to the lighting service, so as to answer any point that is raised and be able to argue intelligently the many points that are brought up when comparing one form of illumination with the other.

We have found that monthly prizes, given to the canvassers who turn in the greatest number of sales, produce excellent results, creating a spirit of rivalry which is kept up from month to month throughout the year. Each article that we sell and each gas outlet that is installed are worth so many points, based on the value of gas consumption to the company, and we have just lately added "maintenance contracts" to the list. We also have our illuminating engineer give the canvassers talks on illumination, so as to fit them for better and more intelligent work in the field, for the future of the illuminating business depends on the effective work done by the men. The hours of our canvassers employed in the store work should be from 1 to 9 or 10 o'clock in the evening, as the most effectual work can be done after dusk. I know it would create a better feeling towards the company when the merchant sees that we are looking after his interests at the time when his lights are burning.

As an aid to the canvasser, one of the gas lamp manufacturers recently brought out a set of blueprints, showing the comparative cost of gas, as against the various forms of electric lighting. Also, a set of tables with instructions as to laying out a lighting scheme along scientific lines, but so simple that a man of ordinary intelligence can comprehend them without the aid of an illuminating engineer.

The correct way theoretically to light a store is to have the regular inverted incandescent gas lamp fitted with the proper diffusing shade, placed in single units over the counter, spaced and hung so as to have the light evenly distributed, but experience has taught us that, with stores of the usual width of 18 to 20 feet, the larger units of the inverted type of fixtures, such as the reflexolier, fitted with proper shades, and the inverted arc lamp, are far more satisfactory to the customer. In the case of the larger units we reduce the number of parts to be taken care of, such as glassware, where there is one globe with the arc as against 8 or 10 pieces of glassware to the single lamp, and 1 pull instead of 4 or 5 when lighting, and only 1 pilot light to look after, the installation is more convenient to light and extinguish, and at the same time meets the argument advanced by the electric solicitor for his wares as to convenience.

I think we should put in such installations of either reflexoliers or inverted arcs at prominent locations on 30 or 60 days' trial, arranged so as to give an example of the correct method of store lighting, for we cannot expect a merchant, using some other form of light or a poor gas installation, to have absolute faith in our arguments unless we are willing to back them up.

Our energies should be particularly directed against the stores that use inferior installations, such as open flame burners and the earlier type of incandescent burner, for we are doing an injustice to ourselves if we allow them to remain in service. In show window lighting, gas meets the most serious competition, as this field is particularly adapted for the use of electricity, especially in windows of the closed type.

A prominent company manufacturing gas lamps has given us some good ideas in this particular by placing a glass deck near the ceiling

of the window, with the lights hidden from view on the upper side, throwing the light downward. Mr. Blood, of the Portland Gas Company, has also given us something new by using a similar deck in the upper part of the window, inserting a large diffusing globe in the center of the false ceiling, so that when an arc lamp is hung close above it the light is evenly distributed through the bowl on the goods beneath. Also, small units can be used, which should be equipped with the right kind of reflectors and distributed along the front of the window in such a way that all the light is thrown downward and back into the window. Practically all the light coming from this direction insures satisfactory shadows on the goods, which is essential in all good window lighting.

A system that is perfectly reliable for lighting the burners in the window from a distance is very much needed. Of the different styles used for this purpose, such as the electric spark, the pneumatic and independent pilot light, the last, I think, is the most reliable. We have the outside arc lamp, that can be used with the parabolic reflector, which gives good results, but it is not as satisfactory as the inside lighting, where the source of light is hidden and can be controlled by a cock or switch.

There should be closer relations between gas companies and the architects, fixture manufacturers, plumbers, editors of building trade magazines and the daily newspapers, brought about by publicity and educational work, setting forth the advantages of gas for store as well as general lighting. Very little has been done along these lines, while the large electric companies have been spending a vast amount of money and labor in advertising their wares, until the better class of the public knowing little or nothing about the comparative values of our product, are beginning to think that electricity is the only up-to-date method of lighting, and that gas lighting is only necessary for an emergency service. All the electric contractors are active canvassers for the electric business, as electric wiring is the mainstay of their business, while with the plumber, house piping is only a small part of the day's work. The electric contractors are active canvassers for the various makes of tungsten lamps, for the installation of these lamps usually calls for some change in the fixtures and wiring equipment. Therefore, we should cultivate the acquaintance of the plumber and keep him posted as to the latest developments of the lighting business, which will give him a further interest in our work.

Readable illustrated articles should be furnished to the builders' and architects' periodicals and newspapers, giving full information concerning, not only the cost and quality of gas light, but the latest designs of gas fixtures. We should follow up closer the work of the architects to get from them the names of people who anticipate building, and advise them as to the best method of lighting their premises before the plans and specifications are made up, for it is extremely difficult to get either the architect or the owner of a building to change his plans after they are once completed. A great advance in the interests of gas lighting will be made when the gas companies can get the confidence of the architects, who practically dictate to the fixture manufacturers and advise their clients as to the style of fixtures and method of lighting.

We must push the sale and advocate the design of more attractive fixtures for gas store lighting, for the tendency up to the present time has been to sell our customers a lighting appliance which gives the greatest amount of light at the least cost. This necessitates an unattractive fixture.

The unhealthfulness of gas lighting is often advanced by competitors as one of the principal reasons why gas should not be used. This subject has been taken up in a recent article by Dr. Rideal in a lecture before the London and Southern District Junior Gas Association, appearing in the *Journal of Gas Lighting*, of March 2, 1909. This should be of great interest to us in the gas business. The substance of it is that, while gas lighting produces more heat, it ventilates the store better and is more healthful than electricity for store lighting purposes, as disease germs brought in from the pavements of our streets, when caught in the current of air, are cremated when coming in contact with the gas flame, and the occupants of a room have a worse effect on the quality of air than does the gas. These facts should be widely advertised along with all the other arguments, so as to get all gas consumers thinking a little more as to the respective merits of gas and other forms of lighting.

Finally, the leading factor in the development of the use of gas for store lighting is the continuing demand for a higher standard of illumination. The use of the tungsten lamp has stimulated this demand, and so has been beneficial to the gas industry. The future is likely to see a still greater demand for higher illumination, and the relative economy of gas lighting is bound to keep it in control of a very large share of store lighting. The gas company thus sells the article which gives the consumer the most light for his money, and it is for us to use every means in our power in the way of good service, aggressive activity and constant watchfulness, so that we can make still further advances in our business.

Discussion.

The President—Will Mr. Samuel Snyder, of Philadelphia, discuss the paper?

Mr. Snyder—I think Mr. Young's paper covers the situation so completely as to preclude further discussion.

Mr. Rushin—It affords me much pleasure to reply to the able address of so distinguished an expert in gas as Mr. Young. A careful study of his paper is enlightening, and I feel, after the close observations I have made of his lines of thought, that my reply must necessarily be in a large measure merely an indorsement of his views. We must all agree on one proposition, namely: That our subject does not imply any doubt as to the future of gas for store lighting; I mean, of course, in those fields where gas is reasonably accessible. There are some few benighted citizens in this country of ours, of course, who are ready to assert that the introduction of other illuminants has endangered the future of gas for store lighting in every field, but with these few we have neither time nor inclination to debate. We are far too busy with the task of analyzing our future and planning to extract from it every possibility it contains. At the very outset, then, I declare, as long as there shall be a future for stores, there shall be a corresponding pregnant future for gas as their means of illumination. Gas has been within man's reach forever, even if he didn't happen to know it for a long time; and, by the blessing of the Creator who gave it to man, gas will continue to be here forever. Now, having made up our minds as to the future of gas for store lighting, in spite of the dreams of other illuminating factors, we naturally ask ourselves, "What can we do to attain the possibilities with which the future is laden?" Mr. Young has made it clear to you that gas for store lighting is about ½ cheaper than other means now coming into general use. Others in attendance here have told us how much more efficient is gas for lighting purposes than some other means. Now, having arrived at the point where we find the items of economy and efficiency all on our side of the argument, what is the natural course for us to pursue? Of course, by inaction we may lose the opportunities that the future holds out so invitingly to us; but who among us will remain inactive? Are we to sit idly by until the enemy, as Patrick Henry would say, shall have bound us hand and foot? Or shall we, like the wise virgins, keep a-polishin' and a-shovin' our lights until the bridegroom, even if he has a hankering after the other "gals," has simply got to see that we have the goods? Plainly, the answer lies with the producers of gas and the manufacturers of gas illuminating appliances. The scene of action is opened up right before them; they know the treasure is within their reach, and they have but to go out after it and bring it in. At this meeting these two controlling elements are gathered together for the purpose of planning the best campaign by which the future may be milked of its possibilities. We have reached this point through rough and rugged avenues, it is true; but here we find ourselves—the gas producers and the manufacturers—traveling together through motives of mutual interest, and together we must necessarily proceed on our way into the future; for all the world like a married couple who will both lose the inheritance if they ever fall out and separate. The best thoughts and the best energy of the gas producer must be put forward in order to give the manufacturer something to expend his latent thought and energy upon. He must, in a great measure, create the demand and the manufacturer must devise new methods for bringing out every degree of illumination it contains. Both must keep the high-speed clutch on the last notch now and hereafter, for if one should slow down the other must necessarily stop and wait for him. What then? Why, the other fellow who has been trailing behind—but who, nevertheless, is always in sight—will creep up and possibly get out in the lead and make us both take his dust. We have only to look into the past, and study the inventions and improvements that have been evolved during the last generation or so, in order to form an idea of what the future still holds in store for us. While I was reading Mr. Young's paper I was reminded that even I, youthful as I am, possess a striking example of the progress made in the field of illumination within the past few years. In my old home, down in the sunny State of Georgia, there is an old chest. Locked within its dusty and musty interior there repose the only means of obtaining light my grandfather had in his days. It consists of a piece of flint-rock, dug out of his native hills, and a bit of steel wrought from the resources of that wonderfully rich but undeveloped region. As I recall those two implements which Nature provided my ancestor, that he might illuminate his environment, I imagine the scene as he made use of the crude materials. The sharp blows he struck with the steel upon the flint; the tiny spark that flew from the impact and became entangled in the ball of cotton near by; the labor he expended in fanning up that spark into a flame, and then in transferring the flame to the poor tallow dip on his hand-carved table—all these efforts to produce a light passed before my mind's eye, and I contrasted them with the illuminating process of to-day, when by simply turning a valve and striking a match we transform the darkest room into a perfect sunburst of splendid light. If we have progressed this far, in the few years that have elapsed since the flint and steel were our means of

illumination, what glorious progress may we not expect now that the best intelligence of the world is awake and on the job of improving our lighting systems? Surely we have just now secured enough light to see the possibilities of the future. Then we were working in the dark; now we are working by gas light. Under which of these conditions may we expect the most progress and advancement in our particular fields? The saying is, "Competition is the life of trade," which saying is true, or it would not have endured so long. If it were not for competition we would be living in the woods, in a state of savagery. From away back in those dark ages up to the present time, competition has stimulated mankind and spurred him on toward better conditions. The whole human race is benefited by improvements which competition has brought about. When competition is honorable it does everybody good, even the gas man; when it is unfair it makes a rope for its own neck. We can only hope to get the original ideas from the field of competition, but after the competition has brought out the new ideas and new devices for illumination, we gas men, that are coupled with the "57 varieties," can adopt these methods, push the illuminating end of the business and get just as good results as if we originated the ideas. A word to the combination electric and gas company, or the 57 varieties. Over all the country gas and electric companies are fast coming under one management, and it has been my observation that in these combination companies gas is being pushed for fuel and electricity for lighting and power, as electricity can be used economically for nothing else than illumination and power. In small cities, where coal is cheap, rent is cheap and room is plentiful, electricity is used very little for power, so if they cannot light with it they would have no use for it. A very important thing that I think should not be overlooked by the combination company is to win the goodwill of the customers, selling all of the light, both gas and electric, that is possible; and this can only be accomplished by having electric solicitors and gas solicitors. As stated back in my paper, "Competition is the life of trade," and this especially applies to just what I am saying now. I have noticed, in traveling around the country, in cities where the gas company is owned by one firm and the electricity by another, there is very little, if any, gasoline lighting. Where the "57 varieties" exists, the gasoline man gets in his handiwork. Ask the commercial man if he goes after gasoline lighting, and he will answer you, "In a way;" and in a way he does go after it, and gets it, I don't think. Isn't it worth something to have a feeling of competition in a city? It's something that cannot be overestimated. Where the gas and the electric company is owned by the same firm and a little competition arises, because a new electric company comes in, everyone quits selling electricity and goes to talking gas. I think a very serious mistake is being made where one company, owning both the gas and the electric systems, keeps one man at the head of both, and solicitors trying to solicit both. Even the scriptures tell us that a man cannot serve two masters. Where one man is at the head of both the gas and the electric company he will die for want of enthusiasm. He knows that it is all coming his way; so, what's the use? He and his solicitors will all fall in a rut, and the only difference between a rut and a grave is in the width and depth. This is the age of specialists and specialties. The doing of one thing will take up all the ability that a man has, and the man who makes a specialty of anything, devoting all of his brain and energy to one particular thing, is the man who makes the greatest success of it. In the great city that I lived in, it is said that one surgeon has operated on more than 500 cases of appendicitis in one pear—he is an authority on that particular disease. When he has a patient on the operating table, after the incision is made, if he sees that something is a little unusual, he does not have to run to the bookcase and read up on it. The same can be said on specializing with gas appliances. The man who makes a specialty of one particular appliance, when he has the sale almost closed, does not have to run back to the office and get a few points. In Mr. Glenn R. Chamberlain's paper, "Increasing Gas Sales to Existing Consumers," he says that in Grand Rapids they make a specialty of having a man call on the barbers, one on the butchers, one on the dentists and doctors, another on hotels and restaurants, and then, even another man to look after the special sales. Grand Rapids is a city of less than 150,000 population, yet they can afford to make a specialty of most anything. This should be an example, and every commercial man should fall in line. As this is the age of specializing things, the possibilities of gas for store lighting should be made a specialty of and pushed by individual men. The gas companies should insist on seeing that all stores are well lighted and every customer visited frequently to see if any changes are required, and if every customer is satisfied with the lights and the bill. It is an act of appreciation on the part of the company, and in return I believe will more than pay us in having every customer satisfied. Also, if the customer is contemplating the installation of some other means of lighting, he will make it known to the party that gave them good services. Mr. Young in his paper says some gas men argue that where a merchant rents a lamp he has no investment and is likely to be an easy prey to some other form of lighting. I thoroughly agree with Mr. Young in thinking that this is not true, and I think there are very few men in the gas business to-day but that, by actual experience and observation, have found their customers have more sense than this. I think, where we find our prospective customers the least skeptical in regard to our goods, we should put the goods in on 30 or 60 days' trial. This is spending money along educational lines, and the chances are 9 to 1 we will win. The risk is not much, and it shows the customer we have faith in our goods. I believe that the biggest problem in the world to-day is the problem of distribution, the getting of things from where they are to where they should be. Coming to the distribution of light, it is the business of the illuminating engineer to teach its proper distribution, so that the consumer will get the best results for his money. Also, to give instructions on the simplest and plainest way that a solicitor should put his proposition before a prospective customer, avoiding just as much as possible big words and technical phrases. I once heard it said that a man with big ideas is always using little words to express himself, while the man with little ideas is always using big words to try to impress the people with the greatness of his little idea. Mr. T. O. Horton, in his paper on "Combustion," set a very good example along this line. At the beginning he says, "I have tried to err to the side of being elementary rather than technical." If we gas men cannot understand technical phrases, how can we expect our customers to? One great drawback in the lighting field in the gas business is that it has been neglected, not by any special order, or on any particular person's part, but by gas companies as a whole. When a customer is secured for a gas range and one for lighting, the range has the right of way over the lighting customer. If one is to be put off until to-morrow, it is generally the latter. If two complaints come in, one for no gas and the other for poor lights in a store, the cannot cook order has the right of way over the merchant who is in a dark store. Then, moving stoves from one location to another always takes the preference over setting meters for the merchants. I have heard a foreman give an order like this, "Set the stove first; then, if you have time, come back and set the meter in the store." I picture to my mind that that foreman remembers the old adage, "The nearest way to a man's heart is through his mouth," and that he had never heard a man say he would rather do without his supper than the evening paper. Light is more essential than something to eat, for through light we gain knowledge, and through our mouths we get indigestion. The advice that comes from one of the richest men in the world to-day is, "Have more light and less to eat." With the aid of an optician he can read just as well today as he ever could, but he can only feast on the "Uneeda." I have nothing to say against the prompt installation of fuel appliances, but giving gas appliances preference shows the curtailment of possibilities of gas for illuminating purposes. The foreman likes to do the things that please the manager, and the solicitor likes to tickle the boss. They know that where the "57 varieties" are hovering over one roof there is an undercurrent which says, "Down with gas for illumination and up with gas for fuel?" Where combination companies retard the illuminating business in such a way, I think they are a hindrance to the community in which they exist. I do not think they are honest with themselves or their consumers, and they will never have the best lighted city as long as they follow such proceedings. Speaking of honesty, I do not refer to it in its basest sense, because a man or corporation is nothing more than a fool nowadays that is not absolutely honest; but honesty goes farther than just what a man does. It is what a man thinks as well. In Atlanta we have two distinct and separate departments. We have separate solicitors for gas and electricity. We do not advertise gas for illuminating purposes, but take care of our share of the lighting business through a solicitor. We sell arcs and reflexoliers on good, liberal terms, and in some cases put them in on 30 and 60 days' trial for a responsible customer. We charge 50 cents per month for maintenance, with 4 inspections per month. Of course, local conditions have something to do with the number of inspections that a lamp should have each month, but I think all lamps should be inspected at least 3 times per month, and 4 times would insure a perfect light at all times. Great care should be exercised in getting the proper man to maintain arcs. In Atlanta our arc maintenance men sell more arcs than our solicitors; in fact, more than half of the orders that we get for arc lamps are brought in the office by our maintenance men, which shows the value of having good men to matntain arc lamps. All of our customers like the men who maintain arcs, and, instead of annoying the customer, the gas arc maintenance man is always gladly received. It has been a great pleasure and a great profit to me, too, to attend this meeting, and I wish you all, individually and for the different companies that you represent, the greatest measure of success. During the reading of his paper, Mr. Rushin said: Competition is the life of trade. Where would the gas business be to-day if it were not for the electric light business? Two years ago, when I was in New York attending the convention of the National Commercial Gas Association, I heard it rumored all around the lobby of the Cadillac Hotel that the National Commercial Gas Association was going to die. I made up my mind if that Association is buried one year from to-day, I am going to preach its funeral sermon.

Mr. Macbeth—I desire to add a few conclusions to this valuable paper by Mr. Young, and will try to cover some of the points not brought out by the last speaker. In his paper Mr. Young brings in the tungsten electric lamp, with three times the light for the same cost, a point which has been generally overlooked by the gas salesman. The tungsten lamp people have been pushing this lamp and doing their advertising on the basis of "three times the light for the same cost," and occasionally "the same light for one-third the cost." Frequently gas salesmen in figuring against that kind of competition, have considered the expression, "one-third of the cost." Experience has proven, however, that the lighting bills to-day, on the electric side of it particularly, are not based on how much a man would like to use, but how much he feels he would like to pay for in the way of light. As a consequence, with tungsten lamps, the standard of illumination has gone up much higher, and the cost has in some cases increased also. At any rate, the net amounts paid do not as a rule show much reduction. In the lower part of the first page a comparison is given between the illumination yielded by the inverted type of incandescent gas burner, with the diffusing shade,

and inverted arc with the most efficient form of electric store lighting, and it is found that the ratio of cost is two or three to one in favor of gas. The writer concludes there must be some other cause than that of economy, if we do not hold and increase our lighting business. The distribution of light from the inverted arc is quite similar to that from the upright arc with an opal reflector. It is simply a change in construction, as far as the two arcs are concerned. There are any number of installations throughout the country where modern electric lamps have not been adopted, and places where they have been put in, which for various reasons have been found unsatisfactory; and I will call your attention to a table of costs, which some of you may have available, based, not on the total quantity of light generated by a lamp per unit of cost, but on costs for equally effective illumination, that commodity which the central stations and gas companies are endeavoring to sell and which all consumers buy. Were we considering only the total light generated for the gas man, there would be nothing to consider but the upright mantle arc with a clear globe. The electric man would find his success almost entirely with the flame arc, with a clear globe. Considering the single inverted lamps, with free maintenance and electric lamps supplied on a free renewal basis. The maintenance costs on gas lamps vary in different places and are subject to local conditions. In the case of tungsten electric lamps, to compete with the inverted gas arc the current should be approximately 6 cents; compared with the single inverted gas lamps, 4 cents. The metallized filament lamp and the inclosed arc would be 3 cents and 2 cents, and so on down to the 3 5 watt carbon filament lamp, which should come in at 1¼ cents, when compared with $1 gas. The point was brought out in a previous paper on the comparison between cost of gas and electricity when used for heat, 10 to 1 was prohibitive. We have 10 to 1 in the case of inverted gas burners, with $1 gas, and the carbon filament lamps, at 13 cents per kw. for current. The point as regards rental and maintenance versus sales and maintenance is, I think, largely one to be decided by local conditions. As the last speaker brought out, were it not for competition everybody would have to buy what they wanted. To a very large extent that is true, and in the case of rental versus sales the question of competition comes in. I am a strong advocate of salesmanship, and believe the showing made by the electrical interests to-day has been largely the result of salesmanship. Regarding the question of color. Very little has been said about the color quality of the light from incandescent mantles. You know the electric lamp people have centered a large part of their sales talk on the matter of color, the sunlight effect secured with their lamp. I will quote a few figures of tests made by Dr. Ives, who is a specialist in this matter, tests which were made by him while connected with the National Bureau of Standards; at present he is connected with the National Electric Lamp Association. He made certain tests with a calorimeter, assuming an average daylight as a standard, a white light efficiency of 100 per cent—compared with this the incandescent mantle, ¼ per cent. cerium, known to the trade as the mellolite, showed an efficiency of 50.2 per cent.; the tungsten electric lamp 33.2, and the carbon filament 21.2. So that wherever you can possibly bring in the color question, there is no doubt about your ground. That is especially true in comparison with green and blue colors, where a very considerable difference is shown. On the value of the illuminating engineer to a large plant, very little need be said; but in smaller plants, 3 or 4 men, fitters and salesmen, coming together and discussing installations in which they are interested, and with which they are in close touch, also installations which have been described in the various technical publications, can get a great deal of good, practical information and help which may be profitably applied to those daily problems which confront them. The question is taken up of stores, 18 or 20 feet wide, as to whether the lamps should be placed over the counters, or to use larger units in the center of the store. The only factor to consider here is the height of the ceiling. With low ceilings it is nearly always necessary that units be spaced over the counter. If we take a store 18 to 20 feet wide, at least 18 inches on either side are used for shelving, which makes 3 feet, 2 feet more for the space between the counter and the shelving, 4 feet, or a total of 7 feet, and about 2 feet more for the counter, a total of 4 feet, or a grand total of 11 feet taken from the 20, so that the customer placed at the counter examining goods is quite close to the central fixture, provided the fixtures can be placed about 10 feet above the floor. One point the gas men have not sufficiently capitalized is the ability to control lights, so far as turning up or down, and using the various sized units are concerned. Before the time of the inverted burners, which are not as satisfactorily turned down as the upright, little has been said about this exclusive advantage either with the upright burners or the open flame. On the question of large versus small units, I know an electric light proposition, with 1 large unit, 150 or 160 feet long, by which light can be generated cheaply. However, this particular device has only been satisfactory for installations where they want long, continuous use over the entire area, and the result has been that, although this device is an efficient generator of light, the total costs have been high, because of the inability to control any section, hence the market has been somewhat limited. As to window lighting. I do not believe there is any question that this can best be taken care of with small units in the front of the window. This "shadowless" window lighting is an ideal which has never been realized, and you would not want it if you could get it. You must have shadows; we get shadows under natural conditions of daylight, and we require shadows for the proper comprehension of proportion, size and detail. One case mentioned here—the lighting system which is accredited to Mr. Blood, of the Portland Gas Company, of having one—4 or 5-mantle—unit in the center of the window. I think that method is open to objection, because, with the goods in that window illuminated from one source, the shows could not be satisfactory. On all goods in the front of the window, where the highest intensity is required, with the one source in the center of the deck, the highest intensity would be on the back, the shadows being on the front of the goods. This kind of a window would appear much better from the inside than from the outside. I wrote one of the customers who had an installation of this kind and asked him if he had any difficulty with glass breakage. He said that he had, but found that if the glass was suspended in a particular manner there would be little liability of breakage. I do not know of any customer for whom I have made a window lighting installation where I would care to take any chance with heavy glass, subjected to heat and draughts. Another point which has a great deal to do with the building up of electrical sales is the help which central stations receive from the electrical contractor. This is a very strong element in the success of the sale of electrical apparatus. Plumbers, as a rule, do not pay very much attention to house piping, as it is usually a small part of their work, and is in general turned over to a helper or improver. The plans for piping and outlet arrangements also suffer, as same are generally left to the boy in the architect's office. It is a rather bad mix up, usually, and anything which can be done to enlist the support and interest of plumbers would be valuable. It would also be of great advantage to properly inform the architects of the advantages of modern gas illumination. We should make more endeavor than is usual to get architects to specify piping in houses. I had an interview some time ago with a prospective customer who desired to put gas in a factory. The architect opposed it. He was a strong electrical man, although he had not gotten beyond the carbon filament age; in fact, did not know anything about the higher efficiency lamps, and, as far as the maintenance cost and costs for illumination were concerned, his information was extremely limited. Finally, as a stopper to his client, he said: "Mr. Owner, I would not advise the use of gas in that factory unless the difference in cost is going to be greater than 10 per cent." There was such a bad case of misinformation and ignorance of the whole subject that I could hardly see what I would do with that architect before I got through with him. I am glad to say, however, that gas is going in on that installation. We should remember all the way through that what the customers want is not the greatest amount of light at the least cost, but the most satisfactory illumination. In my opinion the cost is a very slight factor, and always has been really secondary when compared to satisfactory service. I think the keynote of the entire paper comes in the last paragraph, where it is said: "The gas company thus sells the article which gives the consumer the most light for his money, and it is for us to use every means in our power in the way of good service, aggressive activity and constant watchfulness, so that we can make still further advances in our business." I would, however, substitute "illumination" for the word "light." The electric wave which was mentioned by one of the other speakers has been largely contributed to by the introduction of the tungsten lamp. This lamp, as you may know, is being sold at a high price, which admits of a very heavy appropriation for advertising and sales force, and as soon as that lamp comes down to possibly the basis of the earlier type of metallic filament lamp, the tantalum—and it is less expensive—you will find more of the salesmen who at present are pushing the tungsten lamp, go back to their previous occupations. I have also been told by manufacturers who are in touch with the field, that the electric men are getting into the self-satisfied class, and are not doing anywhere near the amount of aggressive, pushing business they were doing previously, a matter of a year or two ago, so you can soon look for a change. I have also been very frequently told that the gas man is getting along well on the aggressive. It should not be necessary at any time to be on the defensive. As the previous speaker mentioned, if the electric interests are getting into a rut it is only the width and depth of that rut that must be considered, before you will have a better field. You have to go after it, however. This entire problem is salesmanship, pure and simple, and the gas man must go out and push the use of gas for illumination. One clause in Mr. Stannard's paper says that gas can successfully compete with isolated plants—you know the average rate in isolated plants is frequently from 3 to 6 cents per kw. hour, so there is still an admitted margin and an opportunity for getting gas business in many places. A point in the paper by Mr. Young, as regards large stores and department stores, was fully covered by Mr. Gardiner and Mr. Doherty. This is on the matter of rates. Take a large store, where they get sometimes as low as 2 cents, but very frequently 3 or 4 cents per kw. hour, and you have to offer your regular flat price for gas—it is not entirely a matter of the comparison of those two costs, so much as the fact that the electric company gives the large consumer a concession, because of the bulk, not the general load factor, but because of the total amount he will use, and concessions will frequently secure customers. If anything can be worked up, as Mr. Doherty has shown, considering the fixed charges for various sized mains, holders and retorts, showing how a service charge may be defended, and in that way secure a sliding scale rate, and gas rates can be fixed to apply to this character of business, is going to make a very considerable difference to the gas industry in this country.

Mr. Owens—Mr. Young says that "Readable illustrated articles should be furnished to the builders' and architects' periodicals and newspapers, giving full information concerning not only the cost and quality of gas light, but the latest designs of gas fixtures." It is most important to properly advertise our wares; but, more than that,

we must maintain them properly. During last summer I had occasion to visit the offices of The Gas Light and Coke Company, London, England, saw the immense show rooms referred to by Mr. Searle in his paper, and also the hundreds of bookkeepers and clerks, but I did not see the 500 or 600 men whom they employ on maintenance work, but around the city of London I did see the results of the work done by these men. This Company have over 500,000 appliances which they maintain, 200,000 burners, 50,000 public lamps, 125,000 cooking stoves, and nearly 80 per cent. of the cooking stoves are on hire. I bring out these figures, not because The Gas Light and Coke Company, of London, is the largest in the world, but because its sales per capita is one of the best on record.

Mr. Searle—I will add a few words to Mr. Young's paper. The Rochester Railway and Light Company is one of the "57 varieties" with branch houses. In Canandaigua we have an electric and gas plant combined, and we have had more or less electric interruptions, sometimes more, and in figuring out what we should do to give the most satisfactory electric service, we came to the conclusion it was necessary to spend at once about $65,000 in order to go ahead. If that fixed charge is put into the capital investment, the depreciation, interest, etc., would make the base rate so high that the stores could not use it for regular service. We figured that we could go into this village and equip every store, law office, printing shop and every place that used electric light, with reflexoliers, and we did equip them with reflexoliers and charged that back to the electric company. The result has been a largely increased use of gas for store illumination, and the combined use of gas and electricity, and it is a revelation to see the way in which the storekeepers and others will use both gas and electricity at the same time. We recently had some testimonials from the people in that town, who said that the light from the reflexolier was entirely satisfactory—out of 100 only 3 said they preferred the electric light, yet the gas was satisfactory. That town has 8,000 people. We have a big load of light in the Bliss Manufacturing Company's plant, and it is serious if they have an interruption. We equipped that plant with reflexoliers, at an expense of $1,200, charging the expense back to the electric company, and gave them any gas appliance they wanted in any of their departments. That, again, saves a big investment for large kilowatt capacity. I imagine that plant would have a light capacity of 200 kw., and that would be an investment of $4,000—there are 8,760 hours in a year, and the plant would probably be idle 8,000 hours. You can see, therefore, we met the situation much more economically by putting in the reflexoliers. A man can increase the gross revenue of his company from 25 to 30 per cent. on the main street, have everybody happy and satisfied, and give plenty of illumination, by this means. Our friend from Atlanta, who says that competition is the life of trade, makes some good points, and brings in the matter of honesty. I know some men who are so honest they can twist themselves so they can hide behind a corkscrew. My plan is to give your customer in both departments the proper thing, the thing which he should have and not to try to sell him something that is not suited to his needs—any more than a salesman should try to sell a woman a green dress, instead of a blue dress, because he is Irish, and possibly because the woman's eyesight is bad and she may not be able to tell the difference between the two under the light under which the dresses are sold. Some people will not take electric light as a gift, and there are others who will not take gas light as a gift; but we are in business for dividends, and when our friend from Atlanta gets to be the general manager or president of his company, as he surely will, judging from the line of policies outlined in his discussion, he will realize that a general manager under these circumstances is no dill pickle.

Mr. Burr—A word relating to one statement of Mr. Macbeth. He called attention to the fact that the upright gas arc, with a shade, would give approximately the same candle power as an inverted arc, which may be true; but it seems to me he should have gone a step further and stated something regarding the cost. The gas men frequently have to compare the amount of light given by a gas lamp, as against the amount of light that can be procured with an electric lamp, and if it is with the inverted lamp that we expect to compete with the electric lamp, for that reason it seems to me a statement of the cost in this case should have gone with that statement.

Mr. Macbeth—I did not speak of the candle power of either lamp, but rather the distribution of light; that is, the direction of it.

Mr. Burr—I beg your pardon.

Mr. Macbeth—Regarding the use of the gas arc in competition with the electric arc, I have always assumed that the former was designed to compete with the latter, and I do not believe the gas man has much competition with the electric arcs to-day. A number of central stations who own the electric arcs are scrapping them by the thousand.

The President—If there is no further discussion, we will call on Mr. Young to close.

Mr. Young—I do not think very much may be added to what has been said; but I would like to emphasize two points: First. That the solicitors in the business sections of a town should work in their territory during the evening, as it enables them to watch the conditions of the store burners and get better acquainted with their customers. Second. To keep closely in touch with the architects, as they have a great influence with their clients in determining the nature of the light to be used. The plumbers' specifications should also be looked into to see that the gas outlets are properly placed. In towns where the company controls both the gas and electric business, the canvassing work should not be done by combination men, for, as a rule, the canvasser favors one branch of the business, which is detrimental to the best interests of the company.

Items of Interest
FROM VARIOUS LOCALITIES.

THE proprietors of the Detroit City Gas Company have applied to the authorities of St. Clair Heights for a franchise that will govern them in the distribution and sale of gas in that suburb for a period of 30 years. The Company had no difficulty whatever in securing a like franchise from the rulers of Grosse Point.

MR. HOWARD BIXBY assumed charge the first inst. of the direction of the Red Wing (Minn.) plants. Mr. Bixby's successor at Holland, Mich., is Mr. Emory P. Davis, of Mount Clemens, Mich.

A CORRESPONDENT in Newton, Ia., writing under date of the 2d inst., says: "The gas works now being constructed at Ames, Ia., is of the Tenney process, high pressure storage and semi-high pressure distribution. The generating and compressing plant will have a capacity of about 8,000 cubic feet per hour, and the storage equipment is to be: Gas, 40,000 cubic feet; oil, 14,000 gallons. The buildings will be of concrete and brick. The main system so far laid out comprises plottings for 13 miles, to be laid at a minimum depth of 30 inches, and to be provided with couplings of the Dresser type in every 200 feet. The contract price for the equipment complete is $38,000, and the agreement with the contractors is that everything will be in readiness to turn on the supply by August 1st. The Company's staff is: President, C. I. Tenney; Vice-President, John Boyle; General Manager, H. L. Griffin, of Rochelle, Ills.

THE stocks of the Muskogee (Okla.) Gas and Electric Company have been increased in the sum of $2,500,000—from $1,500,000 to $4,000,000—the articles announcing such increase having been filed with the Secretary of State the morning of the 26th ult.

THE Massachusetts Board of Gas and Electric Light Commissioners has approved the terms under which the properties of the Marblehead Gas and Electric Light Company were taken over by the Lynn Company. President Prichard, as an earnest of good faith and as a harbinger of that which is to come, announces that, dating from the 1st inst. the net selling rate will be $1.25 per 1,000 cubic feet—quite a drop from the $2.20 proposition. In the meantime Mr. Prichard's forces are arranging for a sensible system of main extensions.

A CORRESPONDENT in Wilkes-Barre, Pa., writing from there under date of the 1st inst., inclosed the following: "Mr. J. H. Perkins, for some years General Manager of the Wilkes Barre Gas and Electric Company, to-day severed his connection with the Company and will in the future act as Consulting Electrical Engineer for the Susquehanna Railway and Light Company. Mr. Perkins was called to the Company's office last evening about 8 o'clock and was told important business awaited his action. When he arrived there he was agreeably surprised to find all the employees on hand. They presented him with a graflex camera and an automobile clock as a testimonial of their esteem. Mr. Perkins responded briefly, but was almost too surprised to say much more than 'I thank you.'"

THIS official statement respecting the retiring of a certain issue of bonds by the Consolidated Gas, Electric Light and Power Company, of Baltimore, was made public the morning of the 1st inst.: "This Company has sold, subject to the approval of the Public Service Commission, to Messrs. E. H. Rollins & Sons, Boston and New York, $4,000,000, 5 per cent., 3-year gold notes, secured by the bonds of the Company. The proceeds of these notes will be used to refund $3,584,500, 6 per cent. bonds of the old Consolidated Gas Company, due July 1, and for other corporate purposes of the Company. These notes will be of the coupon sort, denomination $1,000 each, interest payable semi-annually, and retirable at any time, on 30 days' notice. The arrangements of the Consolidated Company contemplate the exchange, through the Consolidated Trust Company, of $584,000 4½ per cent. bonds, issued under the Consolidated Gas Company mortgage of 1904, for the $584,000 4½ per cent. bonds now in the hands of the public, which bonds it was decided occupied a position in the market different from that occupied by the bonds it is proposed to exchange therefor. While all the details in connection with this exchange have not been worked out, it is the desire of the Consolidated Company to place the holders of the $584,000 gas bonds, issued since the consolidation, in precisely the same position as the holders of all other gas bonds bearing interest at 4½ per cent. issued before the consolidation and outstanding under the mortgage of 1904."

THE Oroville (Cal.) Water, Light and Power Company will construct a storage holder up to retaining 50,000 cubic feet.

MR. R. A. GOUDY, who has been works' Superintendent of the Altoona, (Pa.) Gas Company since 1907, has resigned from its service to accept the post of Manager in the American Gas Company's plant at Petersburg, Va.

UNDER the ordinance recently granted the Allentown (Pa.) Gas Company to supply gas to the residents of the outlying borough of Whitehall, the Company, amongst other things, shall pay, "As an inspection tax annually the sum of $25 for every mile of said mains laid and maintained in said township, and a proportionate part of said sum for any fractional part of a mile, into the treasury of the said township of Whitehall."

THE complete gas supply of Muncie, Ind., is now under control of Mr. R. C. Dawes and associates, of Chicago. A storage plant up to retaining 500,000 cubic feet will be constructed, and the plant management will be in the hands of Mr. Roy Zeigler, of Montpelier, Ind.

UNDER the franchise granted the promoters of the Atlantic Highlands (N. J.) Gas Company, it is stipulated that gas rates shall not exceed those quoted below:

When Annual Consumption Does Not Exceed.	Net Rate per 1,000 Cubic Feet.
25,000,000 cubic feet.....	$1.50
39,900,000 " "	1.40
40,000,000 " " and over.....	1.30

The life of the charter is put at 50 years, and the books of the Company are always to be open to the inspection of the authorities when these seek to determine the annual output of the Company.

ON the 4th inst. the New York Edison Company filed a certificate with the Secretary of State announcing that its capital stock had been increased in the sum of $5,349,000; or from $45,200,000 to $50,549,000. The same day a violent break in the shares of Consolidated gas was chronicled! How closely some of our speculators are watching the trend of capitalization in the allied concerns of the Consolidated!!

IT is worthy of note that the National Tube Company, of Cleveland, has arranged to ship 30,000 tons of steel pipe by water route from McKeesport, Pa., to Pittsburgh. This is said to be the first river shipment the National Tube Company has made from the local mills.

MR. ALANSON P. LATHROP has been admitted to membership in the firm of Emerson McMillin & Co., vice the late Mr. Henry B. Wilson.

"A STRANGER who happened within the gates of our city the last day of last month would be readily excused for believing that some event of great civic importance was being duly celebrated; but the commotion was altogether outside the pale of State or municipal function, action, commemoration, or what not. No; the affair was altogether a local commercial one and, divested of all glamor, was merely the occasion of the formal opening of the new salesrooms and offices of the Wilmington (Del.) Gas Company, in its own new, beautiful and appropriate headquarters and structure standing over ground numbered and known as 827 Market street. The crush was simply astonishing, several thousand of our residents availing themselves of assisting in the Company's housewarming. As is usual on such occasions, there were demonstrations of cooking, lighting, heating and power; there were luncheons and musical melodies; lectures and speeches—in fact, everything cousonant with such an affair was duly carried out; and I imagine the Company's expenditure on this account, large though it was, has already been repaid it through the better knowledge of its affairs gained by the public's visit to its headquarters. 'C. H. G.' himself was on duty in welcoming and speeding the parting, etc., and Messrs. Schutt, Fox, Lawlor and poor 'Brer.' Lambert all had their joys and troubles over opening day.—BARSTOW."

THE Cruse-Kemper Company is under contract to construct a storage holder up to retaining 35,000 cubic feet, for the proposed South Shore Gas Company, at its Babylon (Long Island) station.

MR. F. C. BUTLER, who was in charge of the Rochester (N. H.) plant, is now similarly in the service of the Greenfield (Mass.) Gas Light Company. Mr. J. Edward Hatch succeeds Mr. Butler at Rochester.

IT is said that the Booth-Flinn Company, of Pittsburgh, have been awarded contracts for the construction of 269 miles of pipe on the proposed natural gas pipe lines from Caddo, La., to St. Louis.

ON the first inst. the Public Service Commission sent a copy of the following query list to every lighting company doing business in Maryland—it will be noted that little is left to the imagination of such operators:

Copy of the charter of the company, and, if consolidated, copies of the charters of its constituent companies.

Statement of capital stock at the present time, and, if consolidated, statements of the capital stock of its constituent companies at the time of the consolidation or merger.

Statements of the bonded debt at the present time, and, if consolidated, the bonded debt of its constituent companies at the time of consolidation or merger.

Statement of floating debt and bills payable.

Copy of its last annual report.

Receipts and expenditures of the last fiscal year in detail, if same are not embraced in preceding paragraph.

Statement of the application of surplus income.

Schedule of rates for electricity for domestic use and for manufacturing purposes and municipal lighting.

Schedule of rates for gas for domestic purposes (light and heat) for manufacturing and for municipal lighting.

Statement regarding deposits by consumers, including the practice in requiring such deposits, when the practice was inaugurated and when discontinued, as the case may be; the present number of consumers; the present number of consumers having deposits and the minimum and maximum amount of deposits required and the average amount of all deposits on hand.

The total number of deposits now on hand and the use made of deposit funds.

The total number of consumers who have made deposits and have since discontinued service without withdrawing their deposits.

The principal on hand covered by the preceding question and the accrued interest to date at the legal rate.

The number of withdrawals of deposits that have been made to date, the amount thereof, together with interest allowed, giving the principal and interest separately, and the rate of interest allowed on such deposits.

The number of withdrawals disapproved to date, the amount thereof and the reasons for disapproval.

The method of recording deposits.

The rules and regulations respecting withdrawal of deposits.

A copy of the receipt given.

AT the meeting for June of the Directors of the Louisville (Ky.) Gas Company, contrary to general opinion, the proposed merger of the conflicting lighting interests in that city was not considered. The question of the Company's semi-annual dividend was also passed to the July meeting. One reason advanced for the consideration of routine business only was the desire of President Sackett to make a trip to Providence, R. I.

APPLICATION was made some days ago to the Board of Town Commissioners of Centerville, Md., for a franchise to govern the operation there of a gas plant, the application having been made rather hurriedly with the thought that if such a franchise were granted immediately opportunity would be taken to lay the gas mains in the excavations that were being made on the sewerage system of the settlement.

AT a meeting of the Directors of the Elmer (N. J.) Gas Company, held early this month, the resignation of Mr. M. F. Riley as Secretary was accepted, and Messrs. Jas. R. McClure and S. W. Appleton were elected as Directors, succeeding Messrs. A. L. Sturr and S. P. Foster. It was also decided to approve the plan for merging the Company with the New Jersey Gas Company, the proprietors of which propose to merge all the South Jersey Companies under one management. The corporations at Williamstown, East Greenwich and Woodbury Heights have assented to the consolidation.

WE understand that the interests which are promoting the Atlantic Highlands (N. J.) Gas Company have purchased the Company which supplies Keyport and Matawan with gas, and will shut down the Keyport plant when the Atlantic Highlands plant is ready for operation.

THE South Bend and Mishawaka (Ind.) Gas Company has filed a petition in the office of the Recorder of Marshall county, Ind., announcing that it proposes to extend its gas mains to and through Plymouth and other points in the named county.

EARLY this month, on the basis of fact that the La Crosse (Wis.) Gas and Electric Company acted within its legal rights in refusing to pay the tax of 2 per cent. on its gross earnings to the City Treasurer, after it had surrendered its local franchise, and had been granted an indeterminate franchise by the State Railroad Commission (July, 1908), Judge Higbee handed down a decision practically dismissing all action. City Attorney, Jno. F. Doherty, says he will carry the case to the Supreme Court and that, if non-suited there, a new ordinance to tax the lighting company will be considered.

ON Wednesday next the Welsbach Company will vote on a proposition to increase the capital stock in the sum of $2,000,000. The new stock will be of the 7 per cent. preferred description (cumulative), and $1,225,000 thereof has been underwritten at par by the United Gas Improvement Company, the proceeds from which will go to take up the floating debt and to purchase the stock of the Camden County Land Company. The remainder of the total issue will be added to the reserve fund.

THE betterments on the plant of the Utah Gas and Coke Company, involving an expenditure of about $350,000, are well underway. A large portion of that sum was allotted to the distributing system, "the boosting" division of which was greatly extended. A new 16-inch main is a feature of the planning. General Manager J. C. Ross is fast on the job, and his reward has been ample, for the output each 24 hours is not far from 1,000,000 cubic feet, and it often exceeds that quantity.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

MONDAY, JUNE 13, 1910.

The Market for Gas Securities.

Depressed conditions in the cotton market are evidently continuing, for the net result over the trading in Consolidated last week was a loss of ½ point. Tuesday last, though, it managed to go to 129 and a fraction. To-day (Friday) the opening was 135½ to 136.

Brooklyn Union is weak and lower. It came in to-day at 140½ to 141. The standing of this Company has not heretofore been broader or better than to-day. Massachusetts gas maintains its advance, and there is little doubt it will cross 90 on this rise. Keep your eyes on Washington gas, which is rated to-day at 350 to 355. Before the summer is at an end these shares will be 400, plus. Lacledes are steady, although the trading in them is little more than nominal, and Peoples, of Chicago, is well up from its recent low point, and is 107½ bid.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

JUNE 13.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$78,177,000	100	135½	136
Central Union Gas Co. — 1st 5's, due 1972, J. & J.	3,000,000	1,000	98	101
Equitable Gas Light Co.— Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual Gas Co.	3,500,000	100	155	165
New Amsterdam Gas Co.— 1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101½
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	35	50
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98½	100½
New York and East River— 1st 5's, due 1944, J. & J.	3,500,000	1,000	104	107
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Northern Union— 1st 5's, due 1927, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	—	75
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	140¾	141
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	299,550	509	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	¾	⅝
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	509,000	1,000	90	96
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	73	73½
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,660,000	1,000	104	106¼
Cincinnati Gas and Electric Co.	29,500,000	100	92	93
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90½	91
Preferred	3,026,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	106½	—
Mortgages, 6's	3,600,000	—	89	100
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	458,000	—	102	105
Detroit City Gas Co	5,000,000	50	—	50
" Prior Lien 5's	4,619,000	1,000	97	100½
Detroit Gas Co., 5's	381,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,225,000	1,000	104¾	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	108	108½
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104¼	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	86
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis	10,000,000	100	101¾	102
Preferred	2,500,000	100	90	100
Bonds	10,000,000	1,000	102½	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	350,000	1,000	106	108¾
" 6 per cent. scrip, due 1910	100,000	25	60	60½
Massachusetts Gas Companies, of Boston	25,000,000	100	83	83¼
Preferred	25,000,000	100	91⅛	92
Montreal Gas Co., Canada	3,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	137	138
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	107½	107¾
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104¾	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.— 1st Mtg. 5's	751,000	1,000	100	102
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgages, 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112¼	115
General Mortgage, 5's	2,465,000	1,000	90	95
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	100	104
Washington (D. C.) Gas Co.	1,600,000	200	350	355
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	361	—

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WILLIAM A. BAEHR,

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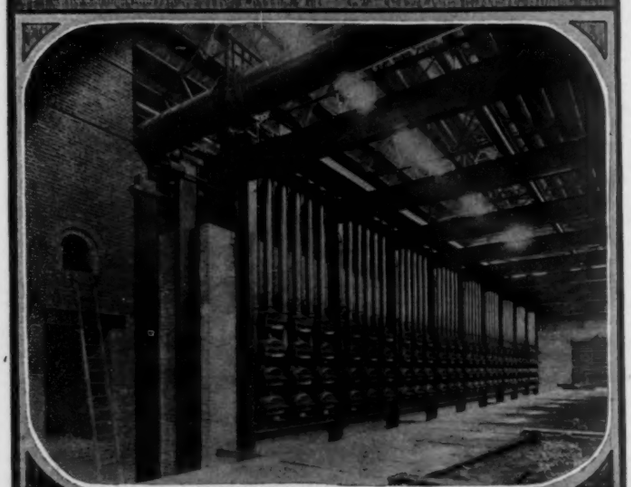

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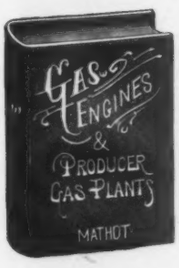

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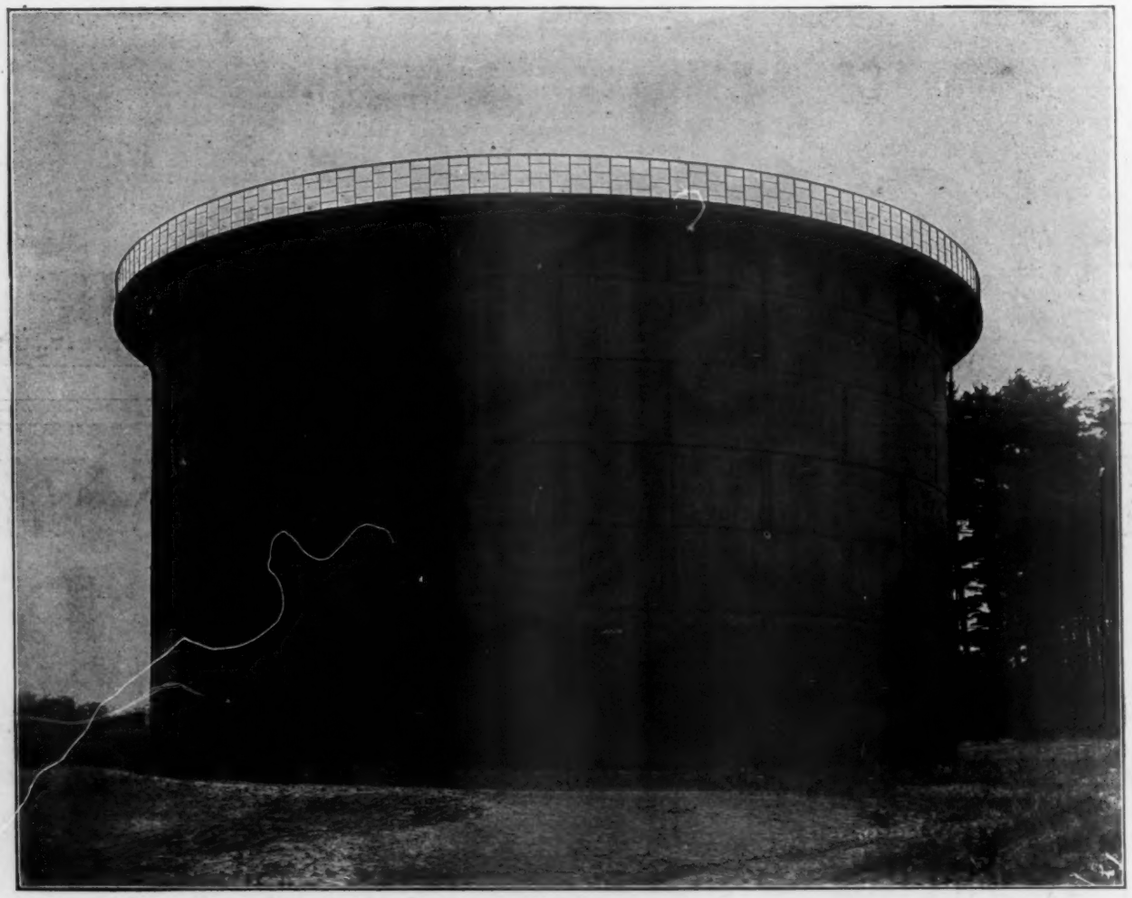

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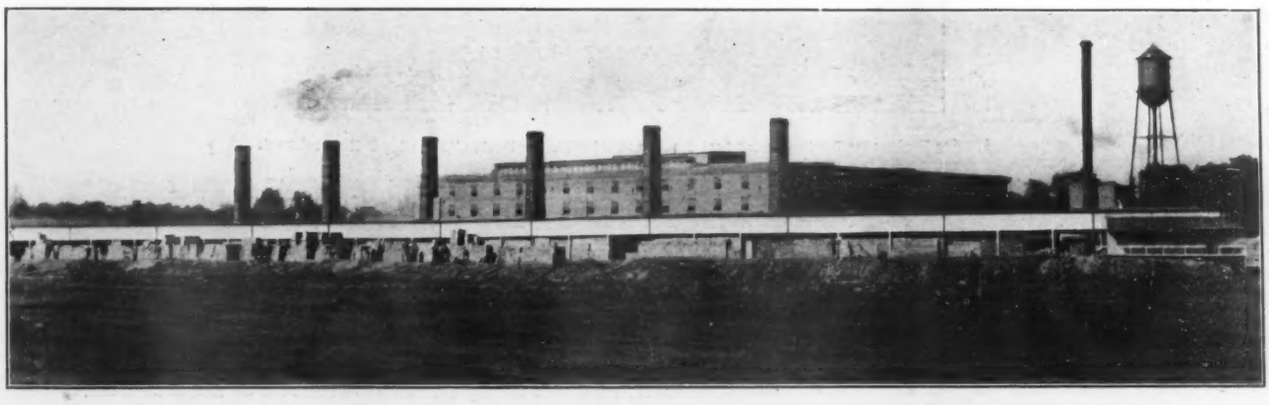

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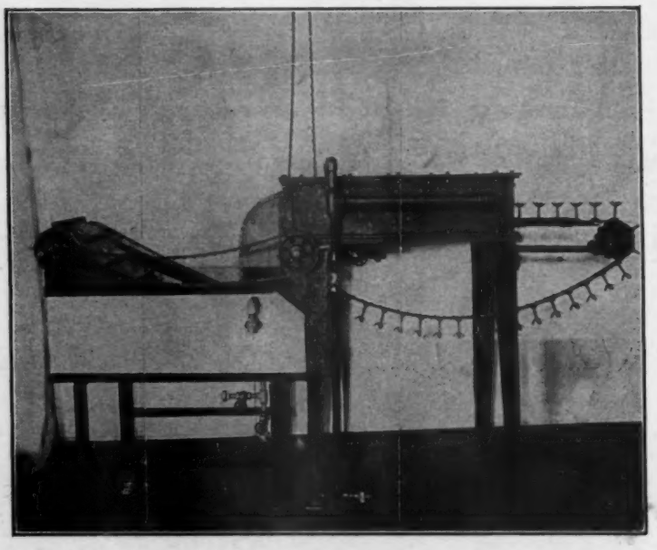

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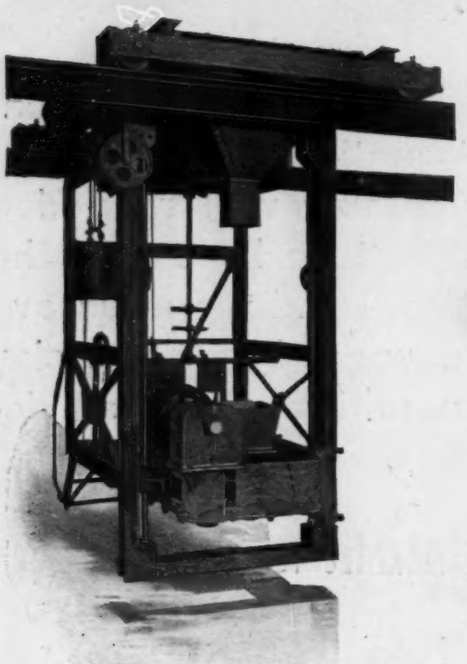

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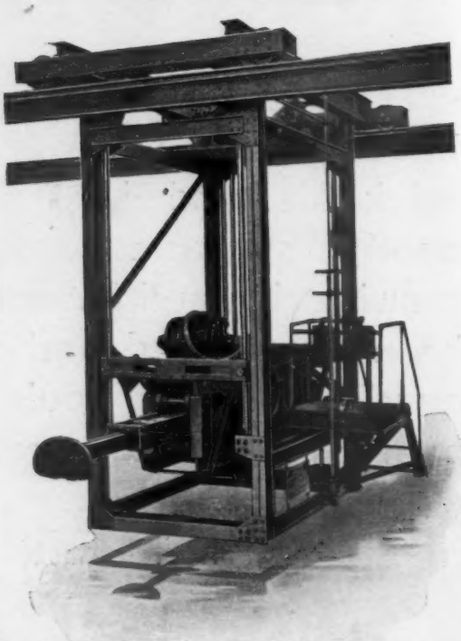

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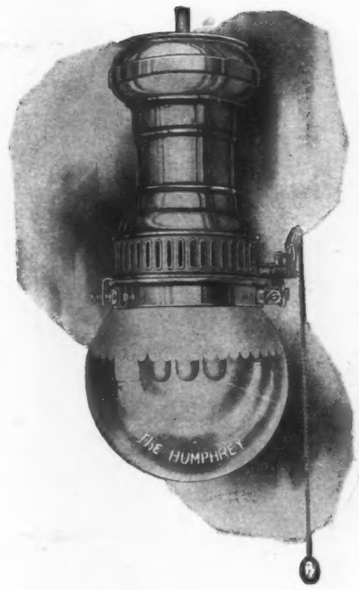

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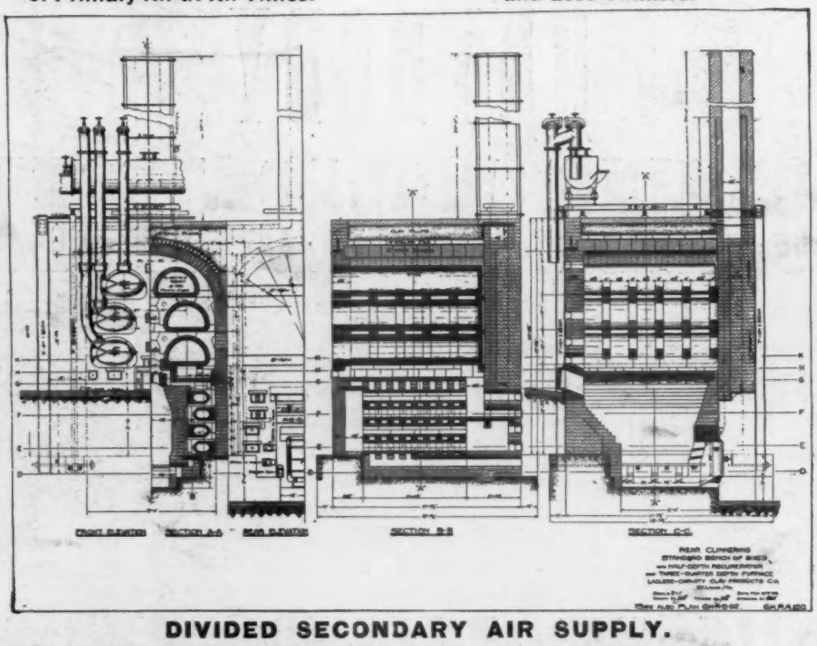

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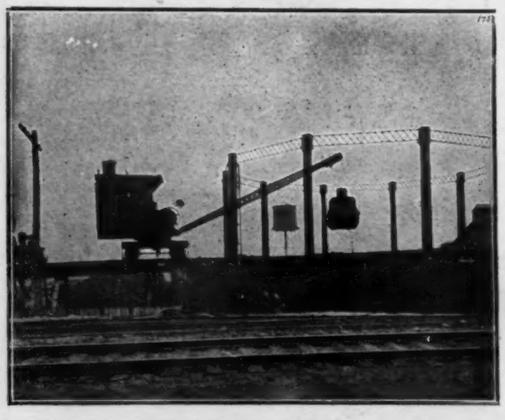

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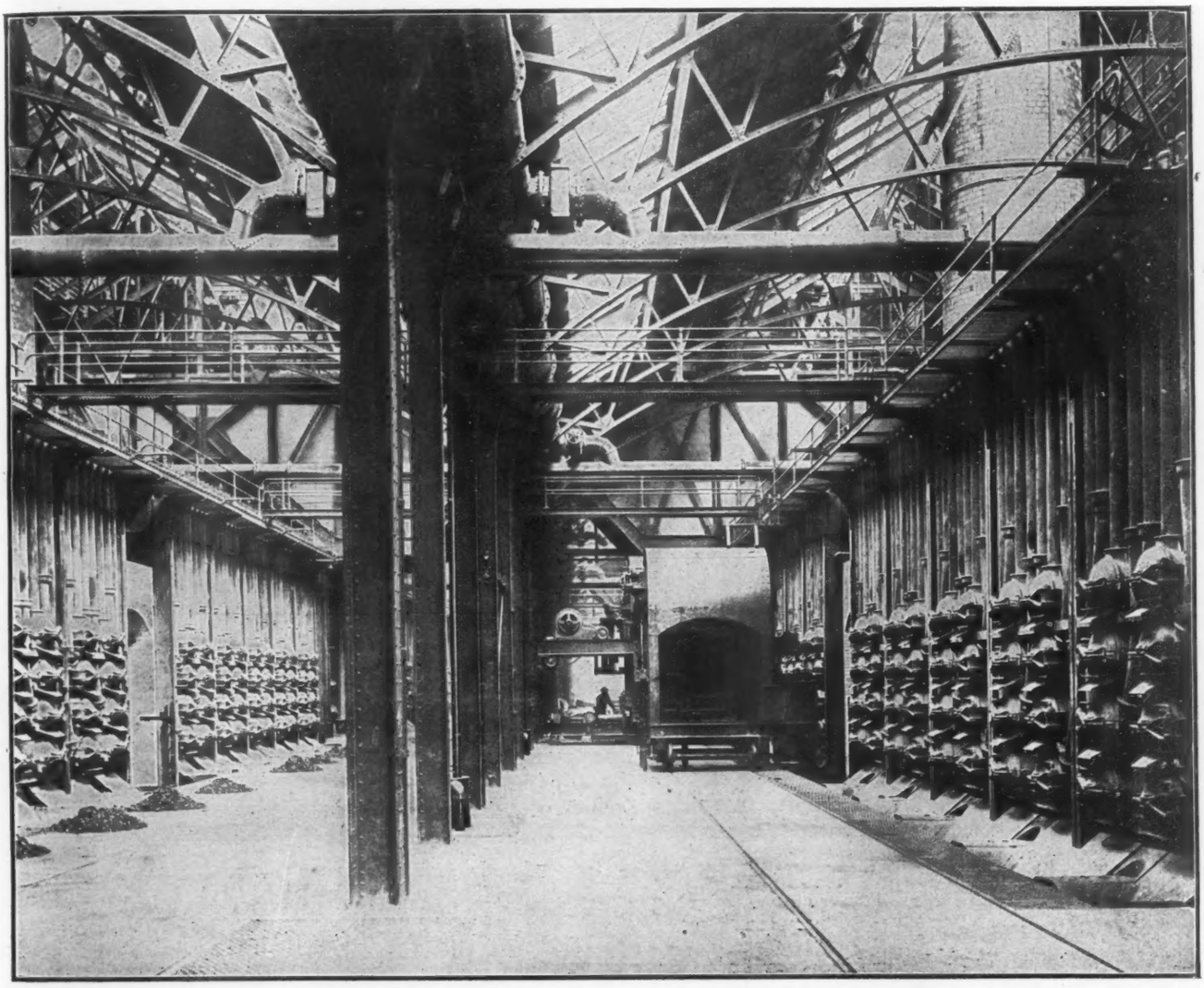

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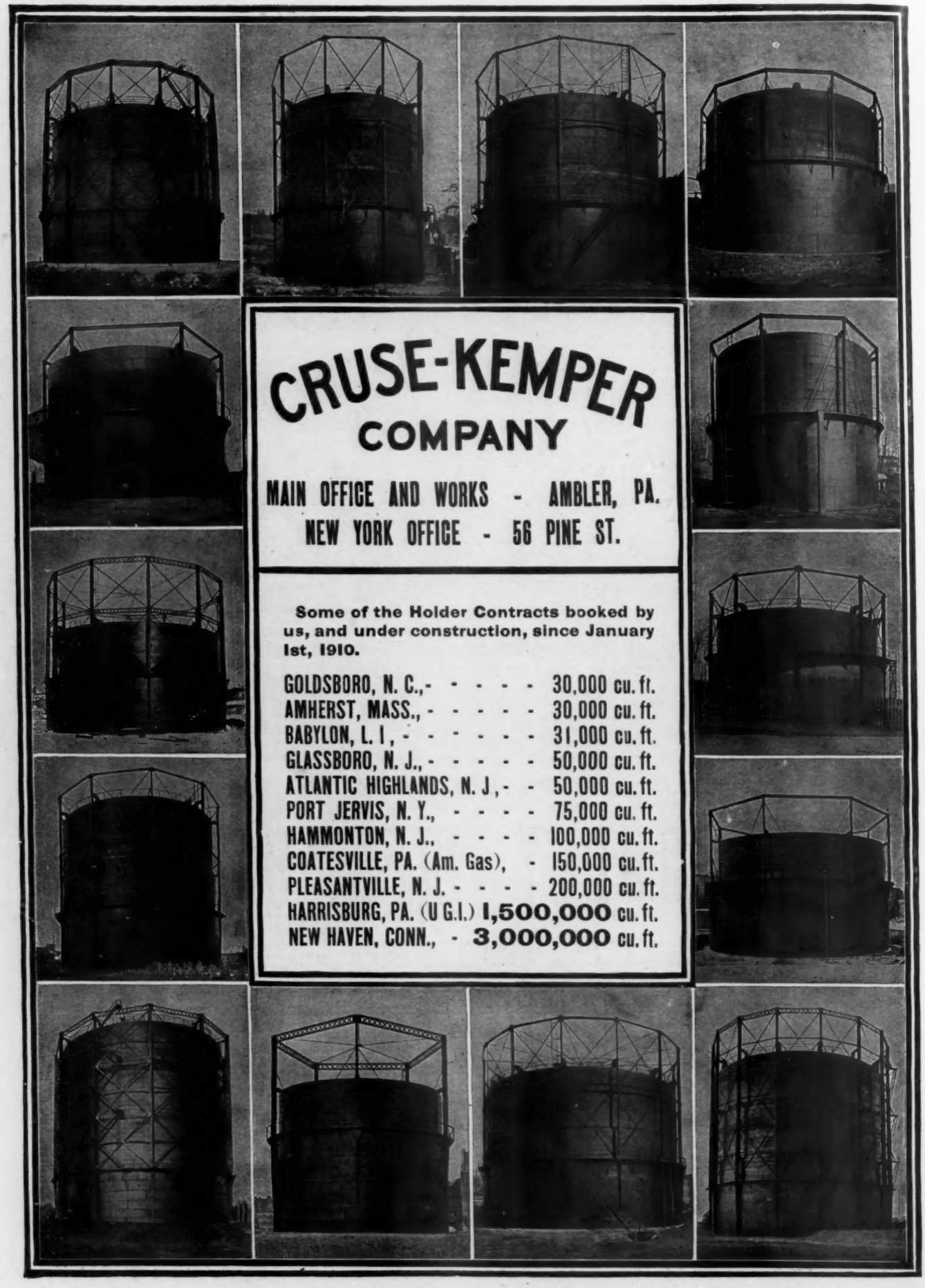
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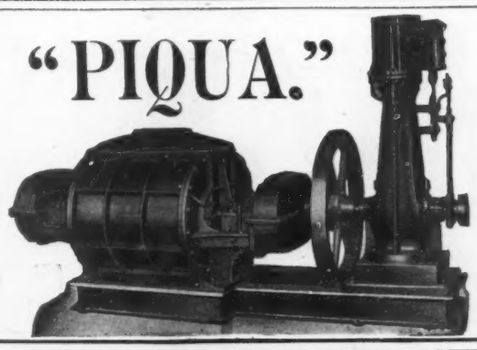

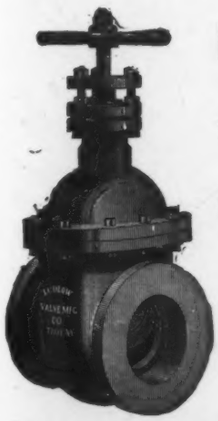

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PUBLIC LIGHTING TABLES FOR JUNE, 1910.

[Communicated by The American Meter Company.]

Day of Week.	Table No. 1. FOLLOWING THE MOON. Date.	Light.	Extinguish.	Day of Week.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Date.	Complete Lighting in 1 Hour. From Time Given.	Complete Extinguishing in 50 Minutes. From Time Given.
		P.M.				P.M.	A.M.
Wed.	1	7.50	2.40 A.M.	Wed.	1	7.12	3.17
Thu.	2	7.50	3.00	Thu.	2	7.12	3.17
Fri.	3	7.50	3.30	Fri.	3	7.12	3.17
Sat.	4	7.50	3.30	Sat.	4	7.17	3.12
Sun.	5	8.00	3.30	Sun.	5	7.17	3.12
Mon.	6	8.00	3.30	Mon.	6	7.17	3.12
Tue.	7	8.00 N.M.	3.30	Tue	7	7.17	3.12
Wed.	8	8.00	3.30	Wed.	8	7.17	3.12
Thu.	9	8.00	3.30	Thu.	9	7.17	3.12
Fri.	10	8.00	3.30	Fri.	10	7.17	3.12
Sat.	11	8.00	3.30	Sat.	11	7.17	3.07
Sun.	12	11.00	3.30	Sun.	12	7.17	3.07
Mon.	13	11.30	3.30	Mon.	13	7.17	3.07
Tue.	14	11.50 F.Q.	3.30	Tue.	14	7.17	3.07
		A.M.					
Wed.	15	12.10	3.30	Wed.	15	7.17	3.07
Thu.	16	12.30	3.30	Thu.	16	7.17	3.07
Fri.	17	1.00	3.30	Fri.	17	7.17	3.07
Sat.	18	1.20	3.30	Sat.	18	7.22	3.07
Sun.	19	1.50	3.30	Sun.	19	7.22	3.07
Mon.	20	2.20	3.30	Mon.	20	7.22	3.07
Tue.	21	No L.	No L.	Tue.	21	7.22	3.07
Wed.	22	No L. F.M.	No L.	Wed.	22	7.22	3.07
Thu.	23	No L.	No L.	Thu.	23	7.22	3.07
Fri.	24	8.00 P.M.	10.30 P.M.	Fri.	24	7.22	3.07
Sat.	25	8.00	11.10	Sat.	25	7.27	3.07
Sun.	26	8.00	11.50	Sun.	26	7.27	3.07
Mon.	27	8.00	12.10 A.M.	Mon.	27	7.27	3 07
Tue.	28	8.00	12.40	Tue.	28	7.27	3.07
Wed.	29	8.00 L.Q.	1.10	Wed.	29	7.27	3.07
Thu.	30	8.00	1.30	Thu.	30	7.27	3.07

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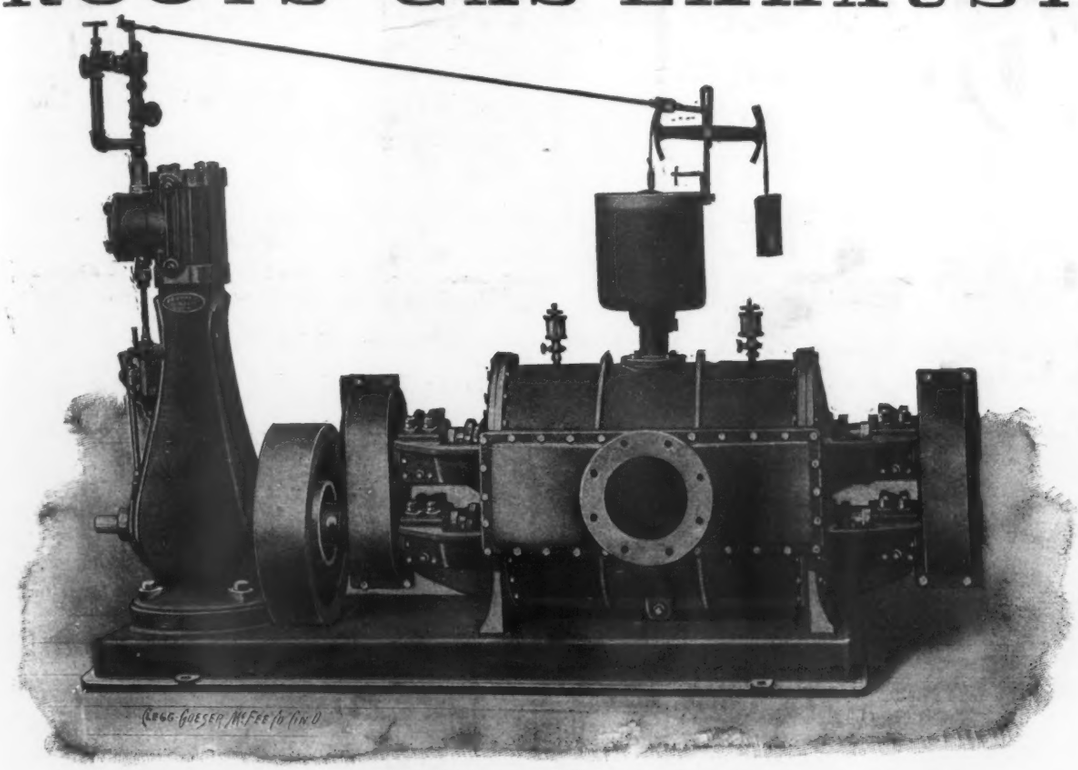

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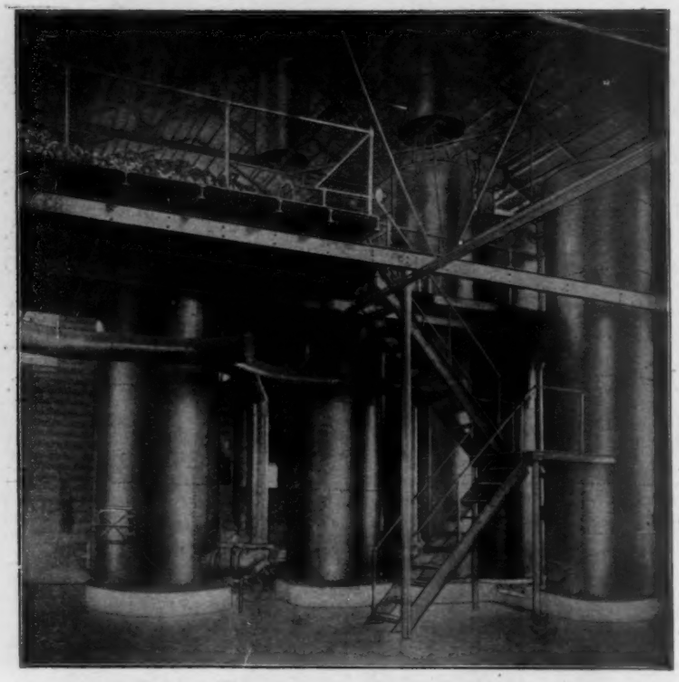

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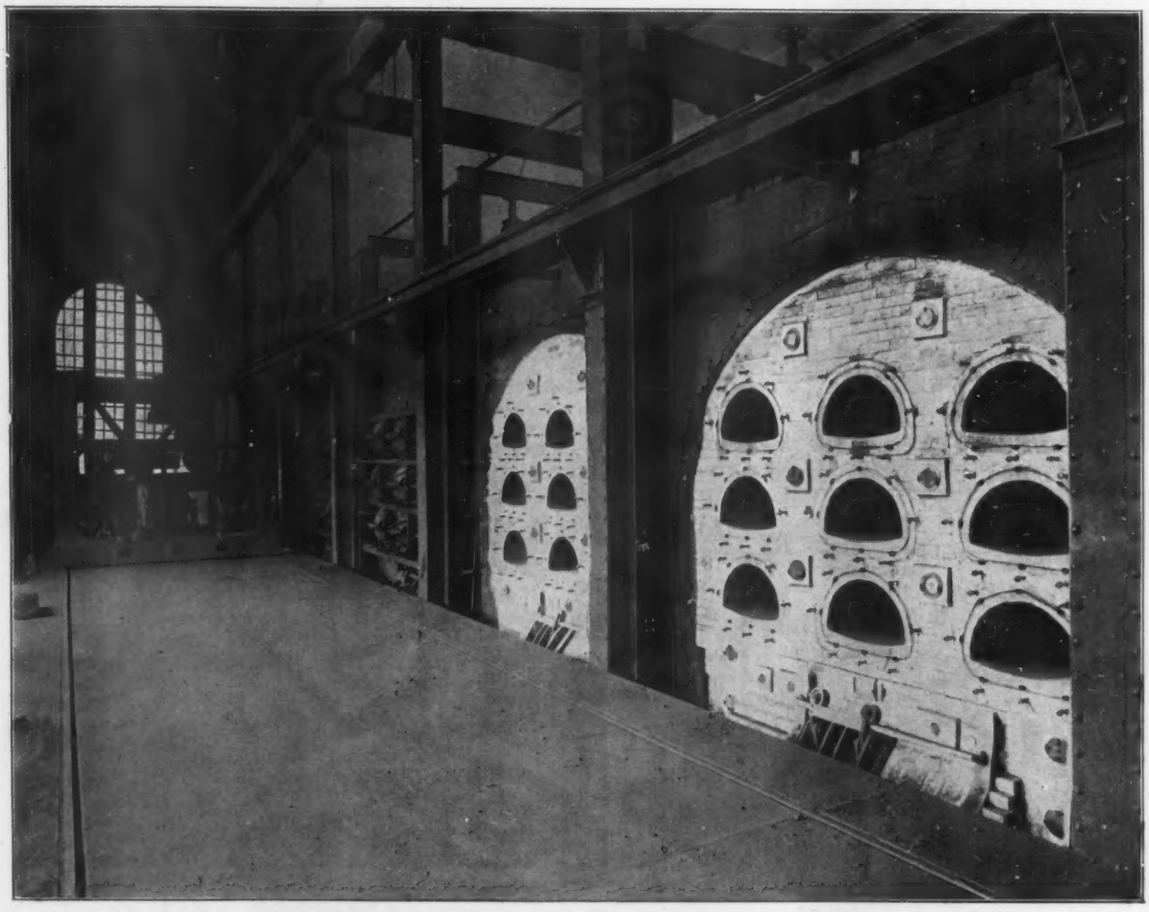

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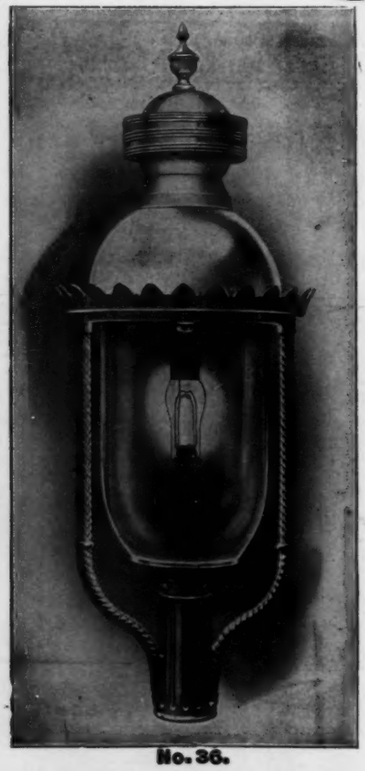

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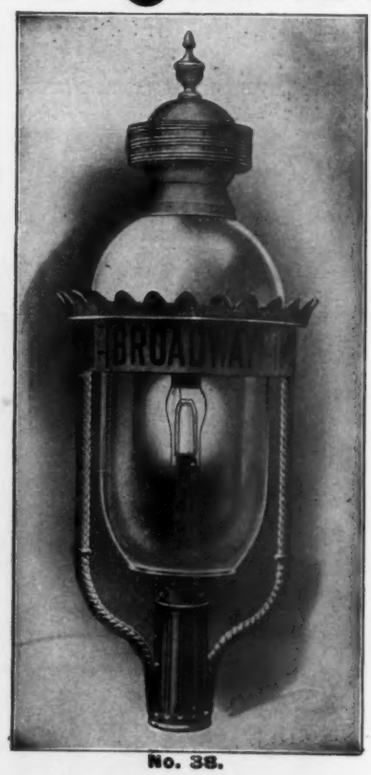

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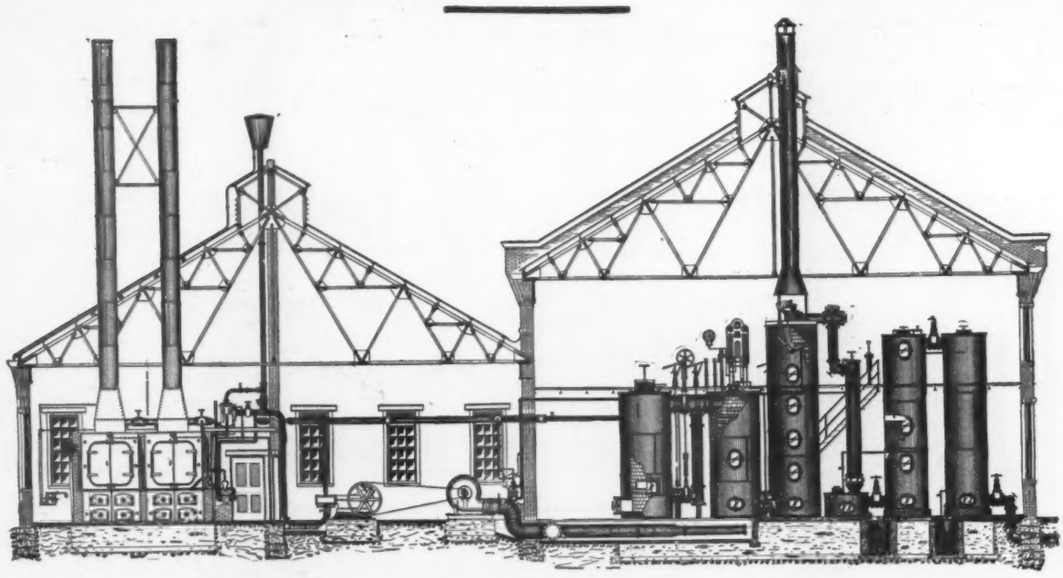

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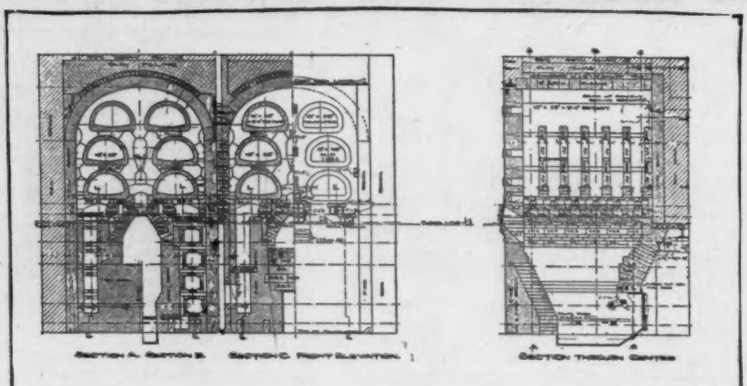

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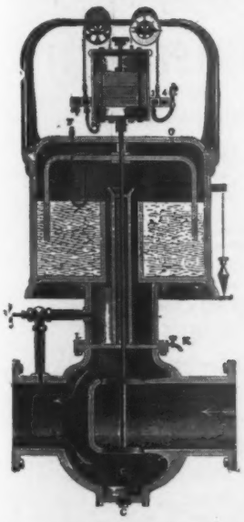

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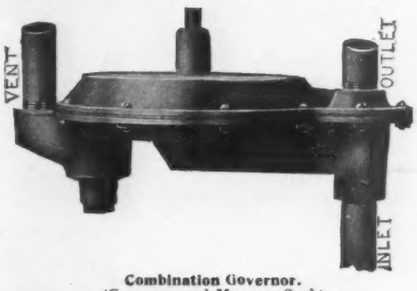

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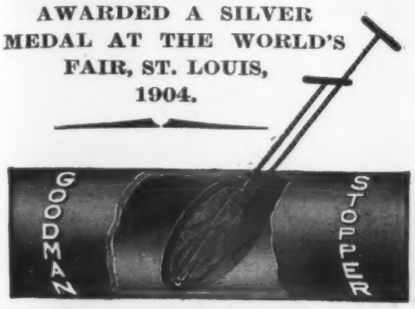

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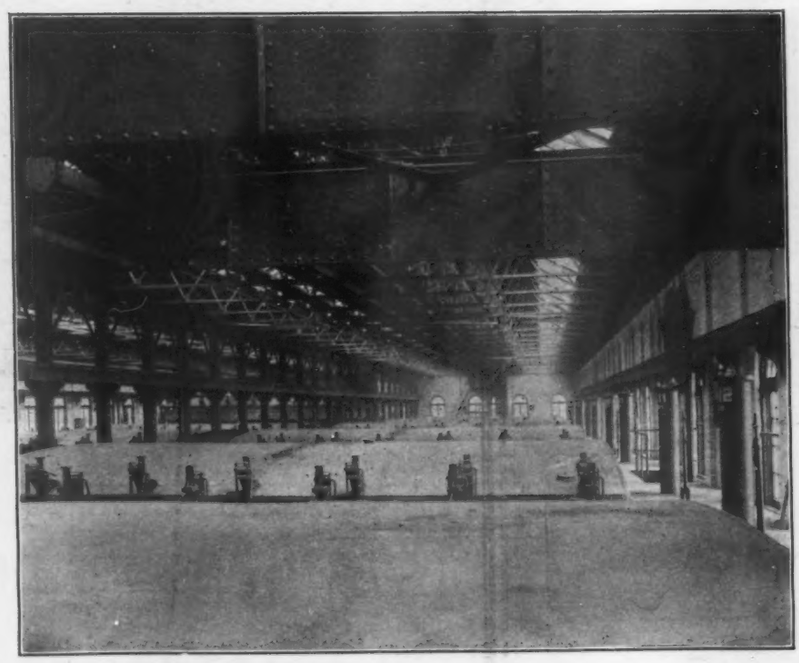

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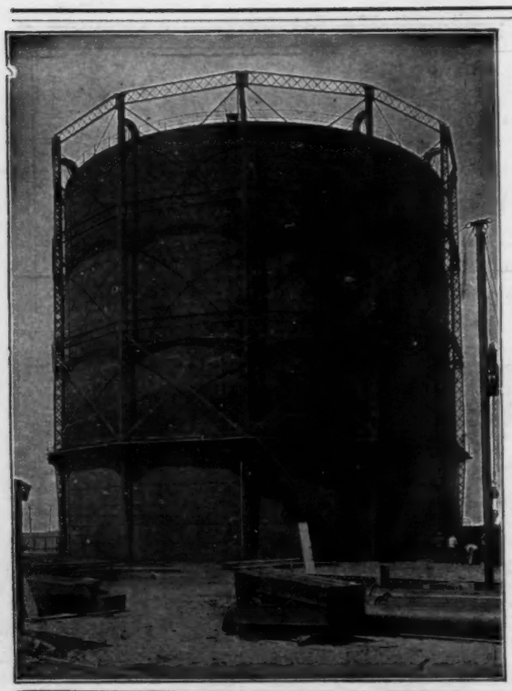

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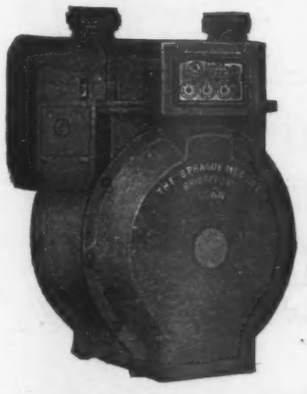

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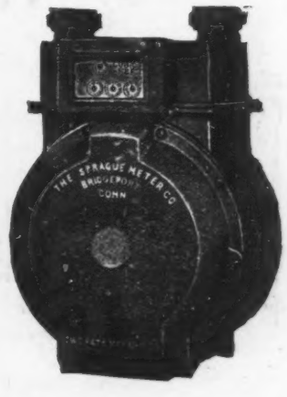

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